



FORESTRY TRAINING MANUAL INTER-AMERICA REGION U·S· PEACE CORPS

OFFICE OF PROGRAM DEVELOPMENT FORESTRY/NATURAL RESOURCE SECTOR PEACE CORPS AUGUST 1982



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Joan Bordman Training Design/Manual Consultant December 1981

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FORESTRY TRAINING MANUAL FOR THE INTER-AMERICA REGION TRAINER GUIDELINES

This forestry training manual has been developed for use in the countries of the inter-haerica Region of Peace Corps. The module or design lends itself to both single country or multi-country use. The design team received from the staff of Peace Corps/Ecuador and Paraguay extensive needs assessments for forestry training in their respective countries. The staff of both countries in turn had input and coordination from the Office of Program Development (OPD). We borrowed the format and some exercises which were modified for use in this forestry training program from the following OPD manuals [Close of Service, Momen in Development, In-Service Workshop Module, CAST Module and Multi-Cultural Model.

Each session of this training program builds towards or from the one(s) preceeding and following it. However with minor modification, sessions may be used independently.

The suggestions for timing, location and administration of the workshop are drawn from the results of the field testing done during the training. While the constraints of your setting may require modifying these guidelines, we suggest that special consideration be given to each of these categories so that training programs may be of the greatest benefits to the potential forestry volunteer.

An effort has been made to purge the instructions and materials of excessive training jargon. Rowever, some remain. The trainer may want to further purge the training language if it gets in the way of communicating with the participants. It is hoped that the language and instructions in this manual facilitates a successful presentation of a forestry training proportam.

FORESTRY TRAINING MANUAL FOR THE INTER-AMERICA REGION

TRAINING PROGRAM OVERVIEW

The general purpose of this training program is to prepare new in-country Peace Corps Forestry Volunteers who have lived in-country for 10 weeks and have had cultural training, language training and have experienced some forestry technical training (i.e., local species identification) and give them 5 weeks of intensive training in forest technology "hands on". This "hands on" training is designed to build confidence in technical areas and forest extension work. This training program continues to build on learnings from Staging/CREST/CAST and in-country training in the area of communication skills building, cultural awareness, community development, and the role of the volunteer. The technical training is directed at the introductions and beginning "hands on" rather than carved "how to's".

Throughout testing the pilot, participants exhibited anxiety about the communication exercises, cultural awareness exercises and community analysis (which they perceived as "sociology"). It had to be explained many times that the skills necessary to work in communities had to be practiced and the more skillful at communication, group process, and community analysis the more effective they would be as volunteers. Technical skills alone were not enough without the ability to transfer these skills to another person. The discomfort with the feelings that are associated with human interaction skills are for the most part lack of awareness rather than insensitivity to the needs on the last of the trainment.

The introduction to practical forestry technology starts with the establishment of a "vivero" (nursery) that trainees complete on the training site. Practice in handling, transporting and actual tree planting are also a part of the "hands on" thrust of the technical part of training. Trainees learn how to pace, measure and survey. They take on special projects such as, plane table building, rustic transit assembling, compost heap start-up, making of a Biltmore Stick, etc. In turn trainees who have taken on special projects teach that skill to the other trainees. In the technical aspects of training, participants conduct research and prepare reports on 'forestry issues. They prepare agro-forestry plans for their sites and participate in species identification projects. At the end of training all reports and write-ups are made into a forestry handhook for the participants to have during their service.

Starting in the second weak of training and continuing through the third week, participants conduct some sessions and are responsible for certain exercises, i.e., making a diameter tape, compost heap, insect collection, lesson plans, etc. This provides trainess with experience in making presentations, skill transference and assuming responsibility.

A week long field trip is conducted during the fourth week of training. The purpose of this field trip is to give trainees practice in forest extension using techniques discussed in the training exercises. This is accomplished by visiting small farmers and/or coloniets, and trying to interest them in forestry projects. There is also reinforcement of learnings in setting up a nursery by visiting several established nurseries and observing and learning applicable/relevant techniques. Further, trainees become acquainted first hand with different species and the environmental niche they occupy in the forest.

Trainees also observe the effects of deforestation, along with the advantages and disadvantages of large scale excite plantations. Trainees will observe agricultural crops and see their potential benefits to agro-forestry projects. During and after field exercises, trainees discuss their observations and compare them to anticipated conditions at their Peace Corps service sites.

During the fifth week, esphasis is placed on technical planning which will be undertaken by the volunteer at his/her work site. Specific forestry techniques such as fruit tree grafting, insect collection, and resource identification are stressed. Further attention is focused on cultural shock and communications with counterparts and host country officials through the use of role playing.

In implementing the sequence of technical and interactions training, it is important that participants understand that the initial review of the technical aspects of forestry will be new to some of them. For those who are knowledgeable in the technical components of forestry, it is an opportunity to help others understand and uractice transferring skills.

The identification and practice of skills developed and arrows of personal growth will be useful in their role as Peace Corps Volunteers. The identification of areas of accomplishment may also be used in the process. Consideration of topics such as the "Role of the Peace Corps Volunteer is Porestry Extension Work" may also be used in the process.

Language sessions are given regularly during training so
that trainees do not lose their language skills. These sessions,
hoth technical and general, emphasize vocabulary, grammatical

structure, and mentence construction. Convermational Spanish is spoken at meal time and during measions. The purpose of these sessions, along with helping trainees retain their language capabilities, is to increase their language skill level during technical training.

Finally participants are made aware from the first session that they are responsible for their own learnings. What we have done in this training program is to provide the opportunity for their educational enhancement. It is not possible to develop a training program specific to every site where volunteers will he placed, and it is therefore up to the volunteer to couple his/her training with knowledge they have about their work site, thereby making their learnings specific to their sites.

TRAINING PROGRAM GOALS:

The design of the forestry training program is such that upon completion, the volunteer will be provided technical information, knowledge and skills - facilitating productive and matisfying Peace Corps Volunteer service.

Specific training program goals are:

- To enable participants to recognize their skills and to feel competent in the use of these skills.
- To teach trainees how to transfer the technical skills they have to others.
- To identify and improve skill areas that need strengthening.
- For trainees to understand their role as Peace Corps forestry volunteers in the host country.
- To help trainees identify and find resources available to them in their community sites and host country agencies.

- For trainees to research species of trees and know where to find information on identifying species both indigenous and exotic.
- For trainees to know how to develop and write-up small research projects, etc., related to forestry in host country.
- The illustration of competency in forestry techniques in planting, thinning, pruning, pacing and measuring trees and stands of trees, grafting and other techniques necessary to forestry.
 - Ability to analyze properly communities' social systems, which should identify problems and help communities seek solutions.
 - 10. Illustration of competency in establishing a tree nursery. This includes site location, planning, layout, soil preparation, scwing of seed, outplanting and maintenance.
 - An understanding of the basic theories of forestry extension work.
 - Increased fluency and improved usage of the Spanish language.
 - Increased interpersonal, team building and communication skills.
 - A better understanding of global and country specific forestry issues.

Objectives and activities for each session will be described at the beginning of each session.

1.1. Advance Information

It is critical that trainees be given the data collection quidelines on the following page form as they go on their 10-day to two week site visits prior to coming to the technical training program. The information which they are asked to gather during their site visits will be used during the course of training.

It is assumed that the in-country training centers responsible tor language and cultural training will also offer some preliminary forestry sessions, i.e., host country specific intormation, tree species, climatic conditions, host country towestry law, local resources and Peace Corps forestry goals and experience in host country.

The country training center should also make it clear to trainous that the technical training program will:

- be intense (little free time);
- entail a great deal of study, rosearch and writing;
- continue to build on cross cultural skills;
- continue language training;
- teach technical skills;
- be experiential, hands on training;
 - highlight and improve their inter-personal skills.

In some cases, training enters may want to give basic courses to generalists to form a more homogeneous training group. These courses could include forest botany, forestry terminology and simple forestry techniques (using an ax, saw, basic tools).

Porestry Observation Guide for Site Visit

While at your site, please gather and record information or the following:

- 1. Climatic Data (local beliefs and official information)
 - a. Rainfall
 - b. Temperature
 - c. Problems; frequency and seriousness

Frost? Hail? Drought?

- Uses of forest products
 - a. Local uses prices
- b. Commercial uses prices
- 3. Porest problems
- 4. Local attitudes and/or traditions related to trees or forests
- 5. The ten most common trees local and/or scientific names
- 6. Agricultural crops that are grown that might have
- 7. Fruit trees
- 8. Soil
 - a. General soil types

agro-forestry potential

- b. Erosion problems
- c. Attempts at erosion control
- 9. Land tenure
 - a. Ownership patterns
- b. Size of holdings
- 10. Animals (wild and domestic) and their influence on forestry
- 11. Measurements and equivalents
 - a. Local land area measurements
 - b. Local distance measurements
 - C. Forest product measurements

- 12. Local power structure
- 13. What aspects of forestry with potential for small practical research project for PCVs need more careful study?

GETTING READY

There are several preparatory steps that must be taken in order to get ready for the actual training program.

On being well prepared, we offer the following suggestions concerning materials and their distribution and descriptions of possible training sites or session sites which will assist in managing staff time and handling the administrative aspects of forestry training programs.

Stock the Library

Several good books and sets of reference materials are needed as library stock. Select materials which will aid trainees in research paper development, agro-forestry planning, and species identification. Further, incorporate a few manuals and research papers that you think will be of general interest. Putting together the library is perhaps the most difficult of all preliminary tasks. You will find that you have few friends and fewer resources when it comes to horrowing books, papers and manuals.

After you have collected all your materials for the library, list them and make 3" X 5" index cards with the title and author of each item, and state if it is a book, manual, paper, etc.

SAMPLE CARD

LEUCAENA -PROMISING Foreage and Tree Crop for the Tropics Name 1. 2. 3. 4. 5. 6.

The appropriate card is attached with paper clip to each piece of reference material. As they are checked out, cards are placed in a box provided for that purpose.

Setting up the library is a day long project for one trainee. After materials are carded and listed, they should be placed on a series of tables that makes them easy to see and thereby determine what materials are available. The library should also have tables and chairs for trainees to study.

Included below is a sample list of reference materials we used in Ecuador. This list is not exhaustive by any means.

REPERENCE MATERIAL LISTING

- LEUCAENA Promising Forage and Tree Crop for the Tropics.
 Underexploited Tropical Plants with Promising Economic
- Value.
 3. Porest Activities and Deforestation Problems in Developing
- Countries.
 4. Succial Readings in Conservation, FAO #4.
- 5. Trees Yearbook of Agriculture, 1949,
- 6. Forest Products in Terms of Metric Units.
- 7. The Natural Occurrence of the Eucalyptus.
 8. Irrivation Principles and Practices.
- 9. Plant Communities. 10. Porestry Handhook.
 - 11. Conservation of Tropical Hoist Forests.
- Establishment Techniques for Porest Plantations, FAO #8.
 Technological Opportunities for Tropical Porestry
 - Development.
 - El Eucalipto en el Ecuador.
- Geografica y Ecologia de las Tierras Aridas del Ecuador,

- 16. Tropical Legumes -Resources for the Future.
- 17. An Introduction to Plant Taxonomy.
- 18. Pinus Radiata, Growth and Economics.
- Pinus Radiata, August, 1970 Proceedings Volume I.
 The Use of Ecological Guidelines for Development in the American Humid Tropics.
- 21. Pinus Radiata. August 1970. Volume II.
- 22. Road to Survival.
- 23. The Process of Communication.
- Sturdy Statistics.
 Firewood Crops.
- 26. Guía Porestal Para la Cuenca del Rio Jabones (2).
- 27. El Ultimo Informe Sobre la Fase I. 28. Ministerio de Agricultura y Ganaderia.
- 29. El Programa "Alamo".
- 30. Guía de Los Ensayos de las Especies Forestales.
- Informe de Evaluación de las Especies Forestales Exoticas de Los Ensayos de Introduction.
- 32. Investigación Forestal con Especies Exoticas en Azuay.
- Results of Exotic Tree Species Trails in Southern Ecuador.
 Intormed Sobre El Bosque Experimental del Ministerio del
- Intormed Sobre El Bosque Experi Agricultura en los Salesianos.
- 35. Plano Basico y Guía Para Ensayos de Especies Exoticas de
- Arboles en Azuay, Canar y Morona Santiago, Fase II. 36. La conclusión de los datos del Cuerpo de Paz de Las Especies
- Exoticas en Las Provincais del Azuay y Canar (1969 78). 37. Informe de Evaluacion del Experimento de Fertilization y de Especies Exoticas (2) de 1975.
- 38. Recomendaciones de Asuntos Porestales en la Cuenca del Rio
- 39. Evaluación del Experimento de Fertilizacion de 1975.
- 40. Green Folder.
- 41. T. Guerrero (Bl.1 (B2.1) (B.3.1).
- 42. Informes Forestales 1977.
- N.R. Plots.
 Paraguay -Classificación y uso Apropiado de la Tierra en el
- Area del Proyecto de Desarrollo Rural Itapua. 45. Bibliography of the Soils of the Tropics. Volume III.
- 46. Guide for Field Crops in the Tropics and the Subtropics.
- 47. Paraguay Una Estratégia de Desarrollo para el Sector Forestal del Paraguay. 48. Paraguay - Algunos Criterios Sobre el Manejo de los Recursos
- Naturales Renovables.
 49. NRDC Tropical Moist Forests Conservation Bulletin.
- NRDC Tropical Moist Forests Conservation Bull Paraguay Documento de Trabajo. No. 23 (2).
- 51. Paraguay Documento de Trabajo No. 19.
- Paraguay Una Estrategia de Desarrollo para el Sector Forestal de Paraguay.
- Paraguay Clasificación y uso Apropiado de la Tierra en el area del proyecto de desarrollo Rural Itapua.
- 54. Legislación y Administración Forestal. 55. Section Three - Cooperative Organization.
- Section Five Cooperative Education and Training.
 Arboles Arbustos del Paraguay.
- Arboles Arbustos del Paraguay.
 Suelos Forestales.
- Curso de conservación de la Naturaleza y sus Recursos Renovables.

- Proposición para la Expansión del Programa Nacional de Capacitación de Orbreros Forestales.
- Situación Actual y Plan de Desarrollo 1980 1984 Subsector Forestal.
- Leucaena Centro de Capacitación e Investigación Forestal de Conocoto. Pebrero -1981.
- 64. Sistemas Silviculturales y Metodos de Reproduccion.
- 65. Determinación de Zonas de Vida.
- 66. Firewood Crops.
- 67. Common Trees of Puerto kico & the Virgin Islands.
- Workshop Agro-Forestry Systems in Latin America.
 Morld Watch Paper 26. Planting for the Future: Forestry for Human Needs.
- 70. Los Bosques del Ecuador y Sus Productos.
- 71. Teaching Conservation in Developing Nations.
- 72. Intensive Vegetable Gardening.
 73. Tropical Legumes: Resources for the Future.
- 74. Trees of Puerto Rico and the Virgin Islands.
- 75. Understand the Game of the Environment.
- Taller: Sistemas Agroforestales en America Latina.
 The Socio-Economic Context of Fuelwood Use in Small Rural
- Communities.
 78. Reforestation in Auro Lands.
- 79. Proceedings of the U.S. Stregety Conference on Tropical
 - Deforestation.
- 80. Agricultural Extension. 81. Papers for Conference on Improved Utilization of Tropical
- Forests. 82. Biological & Sociological Basis for a Rational Use of Forest
- Resources for Energy & Organics. 83. Forestry For Rural Communities.
- 84. Forestry for Rural Communities. 85. Workshop, Agroforestry Systems in Latin America.
 - Workshop, Agrotorestry Systems in Lati 86. Elementary Porest Surveying & Mapping.
 - 87. Arboles de Costa Rico Vol. I.
 - 88. Elementary Porest Surveying & Mapping. 89. Log Scaling and Timber Cruising.
 - 90. New Crops for the New World.
 - 91. A Glossary of Agricultural Terms.
- 92. Tree Planters' Notes. Volume 31. No. 4. 1980.
 93. Luccaena Promising Porage and Tree Crops for the Tropics.
- 94. Manual de Cooperativas Agricolas.
- 95. Unasylva Volume 31 No. 126. 1979. 96. Unasylva - Volume 31 No. 123. 1979.
- 97. The Cost of Scaling & Upgrading hardwood Sawlogs.
- 98. Air Drying of Timber. 99. Soils and Crops, 12th Edition.
- Solis and Crops, 12th Edition.
 Agricultural Program Hanual The Case for Assisting The Small Scale Farmer in Latin America.
- 101. Dry Kiln Operator's Manua).
- 102. Reforestation in Arid Lands.
- kconomic Plants of Interest to the Americas.
 Permanent Logging Roads for Better Woodlot Management.
 - rermanent Logging Roads for Better Woodlot Managemen
 Simplified Guidelines to Hardwood Lumber Grading.
 - 106. Outdoor Classrooms on School Sites.
 - 107. Environmental Education in Action.

- 108. Tree Planters' Notes. Volume 31. No. 2. 1980. 109. Ayuda Bilateral Britanica en Ecuador. Informe
- Ayuda Bilateral Britanica en Ecuador. Informe #4. Breves Notas en Tecnicas de Viveros Forestalis en La Sierra del Ecuador en 1973.
- 110. Ayuda Bilateral Britanica. Mota Tecnica #10. Densidad de Siembra del Pinus Radiata.
- 111. Potencial de la Madera como Combustible: Renovacion.
- 112. War on Hunger.

2. The Training Site

If possible use the host country forestry school when it is not otherwise occupied with students conducting their own courses. The following considerations should be taken into account when

- 1. Land for establishing a vivero (nursery):
- 2. Potting shed with soil for transplanting;
- 3. Seedlings to be outplanted:
- Several stands of trees to measure and a stand of trees for pruning and thinning practice;
- Seeds for outplanting;
- Seed Storage facilities;
- Classrooms;

selecting a technical training site:

- 8. A dormitory and cafeteria that will provide housing and meals;
- 9. A library in addition to the one you have set up;
- Several employees who trainees can talk to about on-going activities at school;
- Research projects, tasks and sites relovent to trainees;
- kecreation facilities, i.e., hasketball court, soccer field, pool table, ping pong.

In choosing the training site it is important to remember that the locus of the training program is on participant learning.
Adulteers should not have to cope with a physical environment that needs a great deal of managing during the training cycle. A certain amount of privacy, running water, electricity and hottled drinking water are minimal requirements. Outdoor recreation areas are also desirable for participants. If you are unable to use a forestry achool, you will then have to use a training site that is close to or can provide items one through seven and number 11 outlined in the training site considerations.

Another benefit of using the host country forestry school is that it ties the Ministry into the training program. We were able to have the Scuadorian Ministry of Agriculture issue a Certificas of Completion to each participant. This certificate showed Ministry cooperation with and approval of the training. It is also beneficial if participants exhibit their certificates at their work sites as this enhances his/her credibility and acceptance by the community.

Plan the Field Trip

First, determine the kind of area and project you want trainees to see and possibly emulate as Peace Corps volunteers. This is an opportunity to point out the problems of deforestatios, soil erosion, and poor range management. It is also an opportunity to point out indigenous and excite species in the host country. After brainstorming the options you have, pick out the ones that will, in your opinion, benefit the trainees most. Further, the field trip(s) provides a good chance to introduce

trainees to a number of host country forestry officials in the field and to practice being extension workers. If you are going to have participants practice extension work, it is imperative that you investigate the site and then work closely with the volunteers on the field trip. We don't want to initiate something that will have no follow-up.

Develop a list of field trip objectives after you have decided where and why you want to go to that site or project. The list should be given to the trainess just prior to the field trips which are scheduled during the fourth week of training.

Now that you know where you are going and why, you need to make arrangements and appointments with various people who you will want to see and talk with during the field trip. Personal contact with follow-up letters reemphasizing the trip itinerary and purpose proves to be the best way of assuring arrangements. It is also good to include with the letter a copy of the schedule if available.

Prepare and provide a daily schedule of events for each participant. You will need to make living arrangements nearest your first appointment for the following morning for yourcelf and the participants. Be careful in the planning of your daily trips that you do not end up spending 75% of your time riding the bus.

Finally, have a bus big enough for trainees, other participants and luggage. The bus company will need to know your route and stopovers.

Tree Planting Site

During the course of training, participants will plant trees. We found a local orphanage that needed trees planted to provide a privacy screen. This site was ideal for our purposes; it not only provided participants an opportunity to work with the children but also taught them as well as the children how to plattrees. Since this exercise must be viewed as a donation of trees and labor from Peace Corps an appropriate institution or organization should be sought for receipt of this donation. An orphanage or grade school is ideal as these institutions are usually non-political. Generally, schools have a need for trees either as privacy screen, wind breaks or fencing.

5. Soil Erosion Site

In the immediate area of the training site an example of soil erosion should be found. You are looking for gullies forming as a result of water erosion that can accommodate gully plugs. Trainees will need to install gulley plugs and examine indigenous vegetation in the area to see if plants, shrubs, etc., have established themselves naturally and could be used as a deterrent to further erosion. Remember to contact the land owner for permission to install gully plugs.

Transportation

It is possible that you will need bus transportation daily to take trainees to technical sessions as well as to tree planting and soil erosion sites. You will need at least one bus for the field trip and possibly two if the training group splits up as was the case in the pilot training program. Depending on the availability of stands of trees for various exercises, you may also need more transportation. Remember the more spread out training sites are the more transportation you will need.

7. Materials

The following is a list of the minimal materials you will

```
seed during this training program.
all point pens*
alotter paper
solt 6 cm long with wing nut
andy bars
:lear rulers*
rommon nins
ravons
Eelt pieces
Flip charts
plass bottles
Slue
graph paper
5x7 index cards
lined paper*
loose leaf binders*
marker pens
masking tape
nails
newspaper
newsprint
old magazines
plain white paper*
plastic bags
primary saws
protractor*
rakes
rubber bands
scissors
scraps of material
seedlings
seeds (20 varieties)
shovels
etakoo
staples
string
survey flagging - red
waterproof pens
wing nut for long
board 1 meter long X 5 cm wide or 1 or 2 cm thick (Biltmore Stick
making)*
board 4 cm (h) X 3 cm (w) x 2 cm (l)
```

*Indicates one for each participant

measuring tape 3 meters long*

board 1 meter long X 1 meter wide (Plane table)
pole 2 cm long (bamboo is good)

small piece of wood 2 cm (h) X 4 cm (w) X 40 cm (l)

CONDUCTING THE TRAINING PROGRAM

Timing

This training program comes at the end of in-country cross

cultural training. It is scheduled at this time so that the volunteer gets exposure to the culture and people of host country and some familiarity with the conditions present at his/her work site.

Location

As stated in a previous section, when planning shead the setting for training is important. A center located in the countrystde is important not only because that is where forest land is most likely to be found, but because it cuts down on having to contend with trainess wanting to do other things, i.e. going to movies, dancing, etc. In other words, the country has minimum distractions.

Available time is limited during the training. In selectia a site consider as critical, the "time lost factor" in taking ora of life activities such as getting food, bathing and sleeping. T atmosphere of the training site directly effects participants' actitude. If they have to spend time coping with the facilities they are less likely to spend time productively during training. Group Size

There should not be less than 12 people in the training program. In countries where there are less than twelve people in the forestry training program they may want to decide on combining with another country with similar geographic and climatic conditions and minilar skill needs to make on the cost of training. If the group size is small the program becomes "incentious." If the group size is too large, the facilitators of not have enough time during sessions to offer individual assistance, especially for the sessions identifying communication skills, technical skills and "hands on" activities. Preferrat

group size should not exceed 25 people. Should the training component exceed 25 participants you will need to allocate a co-trainer for every trainer.

Trainers/Facilitators

This program requires one well rounded, experienced forestry technical trainer, one human interaction trainer and one administrative/technical trainer. If more than one country is involved an additional co-trainer from the country where the training is not to be held should be added to the staff. During the field trips second year forestry volunteers are included as co-trainers.

Sometimes during the small group activities several of the small groups will need the assistance of a facilitator, especially if the group is having difficulty. Once an activity is explained and the exercise begins, the facilitator "floats" from group to group to check that the activity is moving smoothly and if help is necessary. One person cannot cover all groups effectively. It is essential to have the support of another facilitator for redesign, sharing the load and providing alternatives to handling problem situations.

The trainers are the key to the training program. They create the atmosphere, set the tone and help participants achieve maximum benefit from the activities. However in the introductory session, the facilitators should make clear to the participants that each person gets out of this program whatever they put into it.

Sessions

As part of the "tone" it is important to give a clear but concise overview of the training program - what we're doing, where we're going, and why - and while conducting the session take a few minutes to explain an exercise - the direction of the exercise and how volunteers will benefit from it. We have included notes to show you how to do thim.

Materials

In the previous section on "Getting Ready" we have included a long list of materials covering the 5-week long training program. At the beginning of each seasion there is a materials list which you should have ready before the session begins. As there are a great many materials and tools, we suggest that one trainer be in charge of all materials to see that they are not lost and that supplies are maintained and provided for each session. Also there is the one trainer that participants go to when they need materials for special projects.

Journals/Handouts

There is a minimum of handouts trainees receive. Following is a list of those handouts:

Overall training design schedule, Weekly schedule, Evaluation criteria/weekly evaluation form, Schedule of due dates on special projects, Tecnnical papers and pamphiets,

In addition notebooks used for personal journals offer the participant a chance to record thoughts, insights, learnings, technical data or notes that he/she finds relevant and useful. Participants should be provided an opportunity at the end of each day to write in his/her journal.

Sharing

Many of the activities involve sharing with a partner or a small group. You may be asked "Why so much sharing?" A response is that sometimes you get a different perspective about an idea o

thought when you verbalize it or hear it repeated back from other Deople. The purpose of sharing is to add dimensions - trying to help people "stretch" and to get help and suggestions from one Spother.

It is up to the facilitator to create an atmosphere of trust and non-judgement that will encourage people to feel free to express themselves. In any case, early in the training process, the facilitator encourages people to share with each other, but Only to the degree that each is willing to share.

Weekly Evaluation

As a way of determining the progress of training and Obtaining information regarding necessary design adjustments or problem areas, some form of a weekly evaluation should be Conducted. One way is to ask the participants to respond in writing to the weekly evaluation form on the following page.

WEEKLY EVALUATION FORM

Date:_	Name:
	1. I have gained the following
	2. On a scale of 1 to 10 my learning this week has been a
	3. This week has been (respond to all that applies): Informative
	A rehash Motivating Stretching Too much in too little time Unnacessary A whate of time
	Unnecessary Valuable A waste of time A stone drag
	4. This week has (respond to all that applies)
	Challenged me Palafocced tachnical skills Melafocced tachnical skills Melafocced control contident Schelded he to polish communication skills Improved my group interaction skills
	5. Feedback on the training program
	6. Feedback to Trainers

7. Things I would like to see included in training program

Staff Meetings

It is important for trainers and co-trainers to meet daily.

We found that the time when participants were occupied with

Spanish classes was best. The following is a suggested agends:

- 1. How have sessions gone since we last met?
- 2. Are we ready for next sessions?
- 3. What kind of help do we need?
 4. Any participants we are concerned about?
- 5. Any feedback for each other?
- 6. Wole clarification for trainers

The day before personal interviews staff meetings tend to

run longer as staff decides on feedback for each trainee/participant.

run longer as staff decides on feedback for each trainee/participan

It is important that staff have consensus on feedback they provide

to each traines.

Presenting the Sessions

Format

Each session design includes one or more exercises directed

at the goals of the session. The information provided in the clesign includes:

- 1. Session/Exercise Title,
- 2. Total time required to complete session/exercise
- Overview statement describing purpose of session/exercise.
- Procedure and activities sequenced and timed steps which describe what trainer and participants are required to do at a particular noint in the program,
- 5. Material required.
- Material required,
 Trainer Notes: Special
- particular session or e:

- Review the trainer and participant materials;
 - Review the purpose/goals of each session and determine the relationship of the session to the previous and subsequent sessions, and the total course;
 - Prepare session/exercise goals/objectives on flip chart.
 Note: Write these in your own words rather than copying them vertatim from the quidelines;
 - Pe sure all the materials are prepared, equipment is working, and that the space needed is properly set up for training;
 - -Prepare flip charts before the messions; if an easel is not available, paper may be tacked or taged to the wall; -Prepare any lecture notes required - keep these to a minimum - Cather copies of all handouts and worksheets,
 - Review the sequence of activities, the points to be discussed, and materials several times before the session to become thoroughly familiar with the session and its content;
 - 6. Assign shared responsibilities of co-trainers;
 - During the presentations, keep in mind the structure of the session, i.e., introduction, major points summary.

If you are not confident of your own knowledge as to the content of one of the sessions, you may want to look for an cuntile resource to cover that session. We had a soil specialist cover the session on soils and a person actively engaged in acro-forestry cover the session on agro-forestry.

Adding to the Given Design

It has been our experience that outside speakers do not necessarily add to the design. In fact, we had to redo two sessions when speakers did not cover material they were asked to cover. Be sure experts are expert and focus their talks on the required topic area.

Inviting a speaker because they speak Spanish does not

always mean his/her Spanish will he understood. Inviting a host country expert is good because the trainees need to hear articulate host country nationals and see the resources available.

For each session/exercise the trainer should:

- Explain purpose of the session/exercise,
- o Review specific goals and objectives, o Summarize major activities contained in
- session/exercise,
 o Provide time for participants to record in journals.

Remember the time allotted for each activity is approximate. More or less time may be required or desired depending on group size and needs. While some flexibility is "built-in", scheduling should allow for adequate coverage of all activities in each seasion.

WORDS ABOUT TRANSITIONS

Sequence for Session/Exercises

One key to any training program "hanging together" is the participants' understanding of how the pieces (i.e., sessions and exercises) fit together.

It is important to bridge each exercise and/or session with the one(s) that precede and follow it. These transitions are done simply by summarizing what has already happened/been accomplished:

Thus far we've had a chance to get to know each other, review the goals of the training program, and reach agreement on what we might expect from this training......

Then link it to what is going to happen:

of each activity.

In addition to being helpful in "hands on" nursery management, this session will also generate useful data in conducting small research projects.

Each sension/exercise needs to be explained with these linkages in mind. As you prepare to introduce individual activities take a few moments to determine what these transitions are and which once you need to highlight as you explain the goals DAY ONE SESSION 1

Welcome, Expectations, and Evaluation Criteria.

Total Time: 2 hours 45 minutes

Goals (Metas)

- o Introduce staff and define staff roles.
- o To provide an overview of the training program goals,
- o Introduce experiential training method and explain adult learning theory.
- o Go over schedule for week,
- o To share expectations,
 o To provide evaluation criteria,
- o To provide an opportunity to become better acquainted.

Overview

The beginning session is critical to establishing the climate for the entire training program and assuring that eweryone understands the intended outcomes; the methods of training and the ground rules for the conduct of the workshop. It is also the time the left of the conduction of the conduction of the conduction of the helpful to have participants re-introduce themselves in some way that is relevant to the training program.

Exercises

- o Training program overview/goals.
- o Who are you? o Expectations.
- o Working together.

Materials

- o Flip charts, marker pens, tape
- o Handouts: pencils, pens, weekly schedule, training program schedule, loose leaf binders 5 x 7, index cards, pins, evaluation criteria.

Exercise I

Training Program Overview

Total time

30 minutes

Overview

The purpose of this exercise is to introduce the trainers and other staff and to provide a brief review of purpose and goals of the training.

Procedures

Time

Activities

 Welcome and Getting Acquainted Introduce yourself and Welcom Introduce participants to the workshop. Introduce everyone responsible for training and provide an opportunity for them to welcome participants.

2. Training Overview

10 minutes

In the description of the training program the following points may be made: (Show flip chart with the following): o The Adult Learning Theory

need to know.

- The Abore Bearining Theory
 - Adults learn through experience
 Adults learn when they have a
 - Adults learn when they can appl their learning,
 - Adults have a lifetime of experience to draw from.

Lecture should make the following points:

A. To the extent possible, traines will be experiencing training. There will be "hands-on" training. There will be very little directive training as the idea is for them to work out solutions and to solve problems through experience.

- B. The very fact that trainees are here for this program tells us that they have a need to know.
- C. In some cases such as with graduate foresters there will already be knowledge and skill. This training program is designed for them to apply their new learnings.
- D. The trainees have a lifetime (short though it may be) of education, technical skills, job related skills, work experience, and social skills that they have brought with them, which will be sharpened and brought into focus in the next five weeks.
- E. Finally, as adults we expect them to take responsibility for their own learning. We will provide many opportunities, experiences, simulation, and insights for them, but they must understand that they alone are responsible for what they get out of this program.
- F. The skills that we will focus on here are those that will give them tachnical competence to do their job and interaction scillar job within the context of this Latin American culture. It is important that they are not only prepared technically, but through cultural awareness are

Training Goals/Schedule

Briefly review the goals of the training program and explain the sequence of the sessions. Training goals and the titles and sequence of sessions should be displayed on a flip chart for this presentation. At this time each traine should also be handed a previously made up schedule of sessions.

10 minutes

Put on flip chart the following (use your own words):

SESSION 1

Gnals (Metas):

- To enable trainees to recognize their skills and feel competent in the use of these skills.
- To enable trainees to know how to transfer the technical skills that they have.
- To identify areas for skill building and to improve those skills.
- For trainees to understand their role in host country and as a Peace Corps Volunteer.
- To help trainees identify resources available to them and find resources in their community sites and host country agencies.
- For trainees to research species of trees and know where to find information to identify species both indigenous and exotic.
- For trainers to know how to start small research projects, investigation etc., write projects up related to forestry in host country.
- Trainers will have illustrated competency in establishing a tree nursery. This includes site location, planning, layout, soil preparation, sowing of seed, outplanting and maintenance.
- Trainees will have illustrated competency in practical torestry techniques in tree planting, thinning, pruning, pacing, measuring trees and stands of trees, pratting and other techniques necessary to forestry.
- Trainees will be able to analyze communitiess social systems, identify problems and help communities seek solutions.
- Trainees will understand basic theories of forestry extension work.
- Trainees will have increased usage of the Spanish language.
- Trainees will have increased interpersonal, team building, and communication skills.
- Trainees will have a hetter understanding of global and country specific forestry issues.

Exercise II

Total Time 30 minutes

..........

30 minutes

- Objectives:
- To allow participants to get acquainted.
- o To get people talking.
 o To begin building a sharing atmosphere.

Overview:

This exercise gives participants an opportunity to get the know each other. Even if they have met in training before this activity allows them to see each other in a different way and to begin talking and interacting.

This exercise is the first in which the participants share something about themselves. The design suggested here is therefore fairly simple and does involve some risk-taking.

Procedures:

Time

Introduction

Set-up 10 Minutes

Activities

- Introduce exercise by stating the purpose and asking participants to get an index card and a pin.
- 20 minutes for mingling
- After everyone has a card show the following newsprint:

Trainers should join group as participants after you have set up the exercise and are sure people ar mingling with each other.

Time check

Let the participants know when they have 5 minutes left so they can check to be sure that they have talked with as many people as possible.

Summary 6 minutes

 Ask individuals to share some of the interesting "things" they have discussed about each other.

Trainer's Note: Listed helow are five possible introduction exercises that can be used. You may prefer to use another exercise that will accomplish the same purpose.

- Dyad-Ouartet
- Bach person meets and gets to know the other; he/she in turn introduces his/her partner to another dyad.
- Depth Unfolding Process
 Because it takes five minutes per person, this exercise should be done in small groups. The leader should disclose first to make trainees more comfortable.

In the first 3 minutes, tell what has brought you to this point in your life. Use one minute to describe your decision to join Peace Corps. Use the last minute to answer questions from others.

3) Structured Introductions

In dyads, small groups, or in large group, participants can tell why they joined Peace Corps, or write a letter to a friend about their decision.

- Life Map Each person draws on newsprint with crayons or magic marker a picture of their vision of their Peace Corps service, using stick figures and symbols.
- Sentence Completion
 The trainer presents a series of unfinished centences, asking each group member in turn to complete the statement.

Example:

- One of the things I anticipate about my Peace Corps service is
 - o The thing I will miss about home is

SESSION T

Exercise III - Expectations

Overview

The purpose of this exercise is to provide each participant with an opportunity to identify and classify his/her own goals and interest in this training program. It also provides an opportunity to match participants goals with the content of the training program and to either reassure participants that goals are possible or to state reasons why goals may not be met and perhaps to negotiate any inconsistencies which may exist.

Procedures

Time

Activities

Introduction

5 minutes Put items on flip chart

- 1. Divide into small groups. Explain the purpose of the exercise. Ask participants to write on newsprint the expectations they have for this training program. Encourage the groups to record as many items as possible in this short time. Expectations may include things they want:
 - o to know
 - o to have given to them
 - o to have happen/not happen

 - o the facilitator to do/be
 - o the other participants to do/be
 - to be able to do

List Expectations 15 minutes

Encourage group to record as many items as possible in a short time.

Priority 10 minutes

- 2. Now ask each group to prioritize the top five expectations that they all share.
- 3. Ask groups to share their expectations with large group.

Reporting Expectations 20 minutes

Take a few minutes to review the list of expectations.

Comment and eliminate those that the training program cannot hope to address. The program cannot hope to address. The program may be expending on ingenity of the facilitator and technical expertise of the facilitator and technical expertise of the forester trainer. Do not leave group with a list of expectations the facilitators or the program cannot meet.

 Trainer now produces on newsprint, the following list of questions about group dynamics.

discussion 20 minutes

- a. How did your group work together?
- b. Who took leadership?
- c. Did everyone participate?
 d. Did anyone check to see that
- everyone was included? e. Who recorded for the group; how was
- that decision made? f. Who talked a lot, who talked a
- little, quality?
- (consensus, voting, railroading)?
- h. Did anyone summarize for group?

Wrap-up 10 min Trainer asks for observations about what things were the most halfgruin seaks group and records them on newgrint - Asks for things that perhaps weren't mewer that a state of the seaks of

Trainer's Note: You will want to save the expectation list to go over at a later date. It is best to leave posted if possible.

Exercise IV - Working Together

Total Time: 30 minutes

Objectives

- o To present and discuss the administrative, re: time, breaks, housekeeping issues, travel, per diem etc.
 - breaks, housekeeping issues, travel, per diem etc.

 To reach agreement regarding ground rules about
 attendance, participation.
 - o To explain evaluation criteria.
 - To clarify role of trainee and participants.

Overview

This exercise is focused on reaching agreement on ground rules for how program participants and staff will work together. The evaluation criteria are also discussed and questions answered. It is also an opportunity for trainees to clarify their roles and expectations.

Procedures:

LIPIO
Introduction

Activities

 Review purpose and objectives of exercise.

Mechanics, facilities

- Present and discuss appropriate points regarding the mechanics of program including:
 - o starting times/stopping times,
 - o break/meal times,
 - o procedures re: meals, o facilities.
 - o restrooms, offices, recreation,

Ground rules 6 minutes

- Give some general rules about the program and sessions:
 - attendance; no coming and going, arrive on time,
 - participation; i.e., the more you give, the more you get,

- Listening allow and encourage each person to speak fully before the next person begins talking,
 - Importance of keeping on schedule.

Norms 5 minutes

- Discuss the group norms which will help the workshop be a success
 - Need to trust the process and : trainees.
 - Push youself; stretch even tho it may be unconfortable - that is a part of the learning process.
 - avoid heing judgemental with other's contribution - remember that you are responsible for your own learnings.
 - Trainer now produces on newsprint the evaluation criteria. Explains that at the end of each week trainees will be interviewed individually and given feedback based on this criteria.

EVALUATION CRITERIA

Productive Competence

- Ahility to transfer information and skills to others.
- Maintains energy level necessary to accomplish tasks, solve problems.
- Able to acquire information and skills necessary to establish professional credibility in program need areas.
 - Able to speak Spanish at FSI-2 level.
 - "1e to formulate 3-month work plan.

sitivity

ect and empathy,

ural awareness,

raction skills,

Ability to adjust.

emotional Maturity

- Has strong attitude about self in order to deal effectively with new environment,
- Recognize own strengths/weaknesses,
- Able to give and receive feedback.
- Able to modify behavior appropriately,
- Good mix of pessimism and optimism,
- Self confident,
- Self reliant.

Motivation

- Balance between enlightened self interest and altruistic-humanitarian value system.
- Sense of responsibility and accountability to self, PC and host country forestry service,
- Timely and active participation in training activities,
- o Takes active role with group work.

Technical Skills

- Able to grasp basic concepts of forestry techniques,
- o Ahle to use tools,
- Show ability to do simple forestry mechanics and to demonstrate these mechanics to others.

Trainer Expectations

5 minutes

- Outline any expectations you have as a trainer as well as the roles you wish to assume. Responsibilities may include:
 - Providing structure/instruction,
 Introduce each activity and
 - assist in its completion,
 - o Monitor group energy,
 - o Manage how the group works, o Probe/push/facilitate the
 - process of "looking within,"

 drink/have fun/generally enjoy the experience.

Summary

7. Sumerize the activity by emphasizing that this training progree in really directed at helping participants realize that they have many of the skills and information needed to meet the challeng of the skills and information and introducing new tools for them to will be adding to that information and introducing new tools for them to use in formatry. They will develop a new awareness of the volunteer experience and develop skills necessary to communicate, analyze and work with groups in the host country.

TECHNICIAL TRAINING IN FORESTRY - Peace Corps/Ecuador and Paraguay DAILY SCHEDULE FOR TECHNICAL TRAINING I

Breakfast

MONDAY THROUGH FRIDAY

7.00

7:30 -	11:30	Technical training		
11:30 -	12:30	Free time		
12:30 -	1:15	Lunch (only Spanish spoken)		
1:30 -	3:00	Spanish classes		
3:00 -	3:30	Break		
3:30 -	5:30	Continuation of technical training		
		Track I Foresters		
		Track II Generalists		
5:30 -	7:30	Free time and supper		
7:30 -	9:30	Interaction skills; forestry extension techniques; communication (verbal & non-verbal); working with group.		
9:30		Journal Writing		
SATURDAY				
Morning schedule - same as Monday through Friday				
1:30 -	3:30	Spanish classes		
3:30 -	5:30	Individual interviews with staff		
5:30 -	7:30	Free time and Supper		
7:30		Joke and story time (in Spanish)		

SUNDAY

Morning Free

Afternoon Participation in local cultural events on an optional basis.

Special Projects

Total Time: 1 hour 45 minutes

Goals

- ^ To begin the process of transferring skills and experience to others.
- To assume responsibility for teaching others,
- To assume responsibility for completing task assignments.
- To produce a manual for use in field to which all participants have contributed.
 - To have participants become familar with resource library.

Overview

The purpose of this exercise is to begin to identify thos€ participants with special skills and have them assume responsibility for transferring those skills during the training program. To give all participants special assignments which the will have to complete during the first three weeks of training. To discuss materials which have been collected and made available for their use in the resource library.

Exercises

- Introduction of individual projects which all participants are expected to do.
- Introduction of group project.
- Introduction of forester project.

Materials

flip charts, marker pens, tape, special projects schedule of due dates *board 1 meter long X 1 meter wide graph paper common pins rubber hands

board 4 cm (H) X 3 cm (W) X 2 cm (L) pole 2 on long (bamhoo is good) small niece of wood 2 cm (H) X 4 cm (W) X 40 cm (L) nails

wing nut 6 cm long *One for each volunteer *protractors plumh line weight survey flags stakes

*neasuring tapes (3 meters long)

SESSION II

Exercise I- Individual Projects

Overview

The purpose of this exercise is to have each participant identify, research and write up a different species of tree. Based on their site visits they will prepare an agro forestry plan for their sites.

In groups, have participants prepare a presentation on the ecology of their geographical area to present to a class.

In groups, have participants select forestry and research issues and write an extensive paper on the issue.

Have individual foresters take on projects which are integrated into this program design.

Procedures:

Activities

Introduction 5 minutes

 Introduce oxercise stating the purpose. Explain that participants will be writing their own forestry manual and the purpose of this exercise is to get the content organized.

Species

10 minutes

On newsprint introduce the following outline for species section:

```
SPECTES
(ESPECIES)
SCIENTIFIC NAME
(NOMBRE CIENTIFICO)
COMMON NAME
(NOMBRE VULGAR)
FLOWER: TYPE, FLOWERING CYCLE SKETCH
(FLORA)
FRUIT: TYPE, COLOR
(FRUTA)
SEED: GERMINATION, WHEN SEED MATURES, HOW TO COLLECT, METHOD OF
STORAGE, TREATMENT, SKETCH
 (SEMILLA)
 LEAVES: TYPE, ALTERNATE - OPPOSITE, MARGINS, SHAPE, COLOR
 (HOJAS)
 BARK: GENERAL CHARACTERISTICS
 (CORTEZA)
 SHAPE: YOUNG TREE, MATURE TREE
 HABITAT: WHERE TREE GROWS, SOIL, WATER
 (HABITAT)
 USE: LOCAL, INDUSTRIAL, COMMERCIAL
 (USO)
  RANGE: N-S-B-W
  (EXTENSIÓN)
  DISEASE -INSECTS: TYPES, CONTROLS
  (ENFERMEDADES - INSECTOS)
  NURSERY MANAGEMENT NEEDS: HOW TO TREAT IN NURSERY
  (MANEJO EN EL VIVERO)
  MAIN IDENTIFICATION CHARATERISTICS
  (CARACTERISTICAS PRINCIPALES DE IDENTIFICACIÓN)
        1.
        2.
        3.
        4.
```

REFERENCES (REFERENCIAS)

NURSERY REQUIREMENTS: NATURAL REGENERATION: Have sample species written up on newsprint along with sign-up sheet. Note: No duplications; each participant must take at least one specific/different species to write up.

They have until the following day to select species and sign up.

3. Agro forestry site plan. The trainer should explain that this is a new sub-discipline of forestry - about 10 years old - although it has been practiced by farmers to some degree over many years. Since it is a new discipline, there is very little written on agro forestry and nothing which is site specific. Trainer should point out that it is quite possible that this generation of participants are the ones who will write the books and become the authorities. However, based on their own observations and knowledge, we want them to work up a plan for their site area. It should be as extensive as possible.

Ecology teams 15 minutes

4. Ask participants to form groups based on geographical similarities of their sites. They are to select a group leader who will be responsible their calling meetings and managing their burpess of encology report. It is to make up a presentation shout the exclosy of their geographical area which they will be able to present in a school or to a group at their future site. Group leaders are responsible for giving the their groutlet of persons working in

Group process 10 minutes

Trainer now asks group to take a look at their own process using newsprint from Session I, Exercise III Section 4.

Introduction 5 minutes

 Trainer now discusses forestry issues, stating that these are issues which are of concern to all those working in torestry. Since they are issues they will require a great deal of research and discussion as well as decisions about paper write-up.

Topics for Forestry Issues

- l. Industry and Jobs vs. conservation.
- 2. Need vs. conservation (rural dependence).
- 3. Exotic vs. indigenous species.
- 4. Forest Management (an overview).

10 minutes

- 5. Forestry Law, its effectiveness and enforcement.
- 6. Forest products, other than timber.
- 7. Cost analysis of development projects, what needs to be
- considered, possible sources of revenues.
- 8. Cooperatives, local credit schemes and other incentives.
- Elements to be considered in project area surveys are they
 necessary?
 Trainer's Note: The above are some of the issues chosen but are

not all the forestry issues. You may want to add or delete from the above list. The important thing here is to have enough iss. so that at least each pair of trainees can get a different is now to write on.

- 5 minutes Trainees now walk around and look at:
- 5 minutus Trainer now asks trainees to select.
 1884e they would like to work on. At
 least two trainees por issue, not more
 - than four per group.

 10 minutes After groups have been established the
 - select a group leader who is responsib for calling meetings and managing the presentations.
 - 6. Forester projects trainer now introduces a list of projects which introduces a list of projects which individual foresters are asked to volunteer to do; it is explained that these projects are part of the dosign and have specific details which the forester trainer will be able to explic volunteer to projects. Projects and due dates are listed on newsprint. Re can over the next day select a project.
 - a. Making a diameter tape this project involves forester participant assembling the material (which are available) and figuring out the best way for each trainee a make their own diameter tape. Porester trainee then demonstrates the use of a diameter tape and

to work on.

other trainees practice using diameter tape.

- b. Making a Biltmore Stick forester trainee assembles the naterials (which are available) and figures out the best way for each trainee to make their own Biltmore Stick. Forester trainee then demonstrates the use of Biltmore Stick and has Biltmore Stick.
- c. Rustic transit forester trainee assembles the naterials (which are available) and assembles a rustic transit. Shows other trainees how to use rustic transit and writes up directions for building one.
 - d. Plane table survey method Forester trainee assembles the materials (which are available) and makes a plane table. Shows other trainees the plane table survey method. Writes up directions for building a plane table.
 - Porester trainee writes up directions for building a greenhouse using materials locally available.
 Describes this building process to other traines.
- f. Forester trainee prepares a slide show on a forestry related topic. This slide presentation is to be used later by Peace Corps in host country. If alides are not available, forester trainee writes directions for preparing a slide presentation.
- g. Corpost heap at the onest of training forester trainee prepares a corpost heap near nursery site. Explains steps to other trainees, keeps graph of temperature and the time that compost is turned. Compost will be awailable for use compost the training if done correctly week of training if done correctly week of training if done
- Special management of projects for which any participant can volunteer.

Management projects can be selected over the next few days.

- a. Prepare lecture on how to prepare lesson plans. Write up directions. Give lecture to group. Have each trainee prepare simple lesson plan and demonstrate to group.
 - Manage trainee manual, keep track of contents, get ready for publication.
 - c. Manage species report find creative way to introduce reports t group. Give lecture on species identification.
 - d. Manage and facilitate Forestry Isau Presentation, find responders to each presenter. Keep discussion going.
 - Plan tree planting area, assemble needed tools, help other trainees execute planting plan.
 - f. Plan soil erosion walking tour. Find gully for plugging, demonstrat gully plug technique.
 - g. Plan presentation on watershed management. Present to other
 - Manage and facilitate ecology presentation. Find interesting way for group to critique ecology.
 - Select volunteer to collect the daily temperature, weather conditions, winds and humidity and post this information daily.
 - Insect collection and identification. Trainee prepares lecture and gives demonstration.

Traine's Note: A sample of same of the special projects can be tound at the end of this section. You may want to delete some projects and add others that are more specific to host country. However, since those projects are built into design they will have to be covered by trainers if not done by trainer.

trainoes.

8. Summary by trainers should state that we are aware that actual training has not yet bagun but you can already see that we are going to have a very husy time.

We are sure that no one will be bored.

 Trainers are now invited to go to the resource material room to browse around and acquaint themselves with materials available. They are told that the process for taking out a book is to pull the hook slip, sign one's name and put slip in hox provided for same.

Trainer's Note: Within the next few days people will start complaining that others are hanging on to materials they need. At this point trainer should offer sympathy and suggest that complainer needs to take up issue with group.

The Forest of the World, Peace Corps Forestry Goals, the Individual Volunteers' Roles

Total Time: 24 hours.

Goals

- To provide a global view of forestry today and in th future.
- o To provide information on Peace Corps forestry goal:
- To bring the individual volunteer's role into perspective.
- o To have participants brainstorm key problems and possible solutions concerning forestry, reforestatiaforestation in and around their sites.

Overview

This mession is to bring into focus the global wiew of world's disappearing forest. Discussion then moves to Peace goals in forestry and finally brings into perspective the roll the individual columnter. It also allows trainess to search possible problems and propose solutions hased on their observations at their future sites.

Exercises

- 1. Participants brainstorming of problems and solution
 - Lecture on global views, Peace Corps goals, indivic perspective.

Materials:

Flin charts, marker pens, tape.

SESSION III

Exercise I: Problems and solutions in forestry at the volunteer trainees's work sites

Total Time: 1 hour.

Overview

The purpose of this exercise is to have participants

brainstorm and record problems and solutions in forestry at their work sites.

Procedures:

Time

Activities

 Trainor asks for groups to form hased on geographical site locations; i.e., those with similar climate, species, etc. Trainor then asks groups to spend a simute brainstorming problems that they observed while on their site visite with them on ewagrint. Next after solutions are been listed, list possible solutions.

45 minutes

- Small geographical groups present their lists of problems and solutions to large groups.
- Trainer then summarizes the activity and points out similarities and differences.

Trainer's Note: These lists should also be saved as they will be used again as a part of a later exercise. It is best to keep then posted if ρ ossible.

Exercise II Overview of Forestry from a Global Perspective, th
Peace Corps Goals, and the Individual Volunteers

Role

Total Time: 1 hour, 10 minutes

Overview

The purpose of this exercise is to give information on the world problems in forestry. To state the Peace Corps goals and give hope to the individual volunteer that they can play a part changing the grim prediction for the world's forests.

Procedures

Time

Activities

 Trainer, or if possible visiting authority on forestry, gives lecture global picture. Lecture outline follows.

GLOBAL DEFORESTATION

- I. Causes of Deforestation
 - A. Clearing for Agriculture
 - (1) Shifting agriculture
 - (2) Colonization
 - (3) Unemployment (4) Land tenure
 - (5) Cattle raising
 - B. Firewood Gathering
 - 4/5 of volume removed from tropical forests is for firewood.
 - (2) Charcoal Production
 - C. Logging
 - (i) Clearcutting
 - (2) Damage to standing timber left 55% of stand
 - (3) Little reforestation
- II. Success of reforestation will include:
 - A. Technical proficiency
 - B. Personal fulfillment
 - C. Agency accomplishment
 - D. Community involvement
- Selection of areas of action out of awareness of total picture.
 - A. Results of Deforestation
 - (1) Erosion
 - (2) Loss of raw material
 - (3) Siltation River; dam (4) Soil infertility
 - (4) Soil infertility (5) Economic loss
 - (6) Extinction of flora and fauna
 - (7) Lack and/or reduction of water
 - (8) Lack of toilet paper
 - Trainer or if possible Program Manager from Peace Corps gives lecture on Peace Corps goals for forestry.

Lecture outline

20 minutes

- A. Ideal: Educate people to:
 - 1) Conservation
 - 2) Rational utilization of resources

B. Practical: Plant as many trees as possible.

C. What to do:

1. Agency Problems

- _ _ _ _
 - Political
 - Emphasis on technical
 - c. Lack of interest
 d. Efforts do not address problems
 - e. Lack of resources
 - f. Laws
 - g. No cooperation with other agencies; no cooperation among field of specialization

Trainer gives the lecture on what the individual can do. Outline follows.

2. Campesino/community Problems

- Have other problems to solve
- b. Getting people together is difficult
- c. Level of education is usually low d. Cultural habits difficult to work with

20 minutes D. The Answer?

1. Forestry Measures

- a. Agroforestry systems b. Village woodlots
- c. Intensive plantations
- d. Hetter management Reserves
- e. Regulating logging practices
 f. Application of known technology
 q. Research

2. Enabling Actions

- a. National development patterns
- b. Alternatives -food supply
- c. Increase crop yields
- d. Land tenure e. Effective attention energy
- f. Conservation of forest products
- g. Better stoves recycling h. Reduce waste
- i. Population
- 's Note: In the back of this section are sample lectures. I want to put these views in your own words. However,

I want to put these views in your own words. However, ng on resource people available at the time of training you need to worry about lecture preparation. 15 minutes

4. Trainers and/or speakers ask for questions from participants. Trainer surprises pointing out that volunteers are a part of a large picture and have a valuable job to do and that we are going to spend the next 5 weeks getting ready to do that job.

15 minutes

At this time the director of conference/training center may want to say a few words of welcome and give tour of training facilities.

Language Class

Total Time: 1% hours

Goals:

- To provide trainees with language classes to hold language capabilities at entry level or if possible, increase language proficiency.
- To integrate technical language as part of language training.

Overview:

In this first language class, it is important for teachers to set the ground rules for class. Basically classes are to be conversational, but grammar will also be stressed. Proper pronunciation of words will also be stressed.

Procedure

Activities

Time: 1% hours

- Teachers will be given the activities of each session. They will discuss in Spanish the activities of preceding sessions.
- Teachers will go over vocahulary list for each day helping participants with pronunciation and putting vocabulary words into sentences using correct grammar.

Vocabulary list

Attorestation - repoblación forestal; aforestación Tros class e de ábol boology - ecología Flower - Fl

Leaf - hoja Nut - nuez

Reforestation - reforestación

Seed - semillia Site - sitio

Tree stem - tronco, tallo

Tree - arbol

mood nadera

SESSION IV

Feedback and Journal Writing

Total Time: 1 hour 45 minutes

Goals:

- o To review how to give and receive feedback;
- o To learn more about ourselves;
- o To become more skillful in obtaining and understanding information about the effectiveness of our behavior;
 - To hecome more sensitive to our reactions to others and
- the consequences of these reactions;

 Participants will understand the importance of keeping a journal.

Materials:

 tlip charts, marker pens, tape, note books with tabs for journals.

Exercise I Feedback

Total Time: 1 hour

Overview

The purpose of this exercise is to remind participants that although they may have had lectures and some practice in feedback, that giving timely, skillful feedback needs to be practiced.

Procedures

Time Activities

- 1. Trainer should acknowledge that everyone of the trainess has been through 5 minutes feedback practice at the CAST, CREST, or Staging and that many may have had an introduction to feedback even earlier.
- 2. Ask individuals to jot down as many feedback rules as they can remember off the top of their heads.
- 3. Trainer now produces newsprint with the following rules;

FEEDBACK RULES

- 1. It is honest and frank rather than diplomatic or subtle. It is true reporting of your real feelings and reactions to the behavior of another person. This implies that you are aware of your reactions and are willing to run the risk of possible rejection by sharing then with the other person.
- 2. It is <u>specific</u> rather than general. To be told that one is dominating will probably be as useful as to be told that: "Just now you were not listening to what the others said, but I felt I had to agree with your arguments or face attack from you."
 - 3. It is focused on behavior rather than on the person. It is important that we refer to the person does rather than to what important that we refer to the person does rather than to what we think or imagine he is. Thus we might say that a person rather than anyone less in this meeting rather than that he is a "loudmouth". The former allows for the possibility of a "loud the latter implies a fixed nerronality trait.
- 4. It takes into account the needs of the receiver of feedback. Peedback on be destructive when it serves only our own needs and fails to consider the needs of the person on the receiving end. It should be given to help, not hutr. We too often give feedback because it makes us feel hetter or gives us a psychological advantage.
- 5. It is directed toward behavior which the receiver can do something about. Prustration is only increased when a person is reminded of some shortcomings over which he has no control or a physical characteristic which he can do nothing about.
- 6. It is <u>solicited</u>, rather than imposed. Feedback is most useful when the receiver himself has formulated the kind of question which one can answer either by observing him or through actively seeking (soliciting) feedback.
- 7. It involves sharing of information rather than giving advice, By sharing information, we leave a person free to decide for himself, in accordance with his own goals, needs, etc. When we give advice we tell him what to do, and to some degree take away his freedom to decide for himself.
- 8. It is well-timed. In general, inwediate foodback is most useful (deponding of course, on the person's readiness to hear it, support available from others, etc.). The reception and use of feedback involves many lossible emotional reactions. Excellent feedback presented at an inappropriate time ray do more harm than good.

10. It concerns what is said or done, or how, not why. The "why" takes us from the observable to the inferred and involves assumptions regarding motive or intent. Telling a person what his motivations or intentions are more often than not tends to alienate the person, and contributes to a climate of resentment, suspicion, and distrust; it does not contribute to learning or development. It is dangerous to assume that we know why a person says or does something, or what he "really" means, or what he is "really" trying to accomplish. If we are uncertain of his motives or intent, this uncertainty in itself is feedback however, and should be revealed.

11. It is checked to insure clear communication. One way of doing this is to have the receiver try to rephrase the feedback he has received to see if it corresponds to what the sender had in mind. No matter what the intent, feedback is often threatening and thus subject to considerable distortion or misinterpretation.

> Trainer asks how many of you remember all eleven rules?

- 4. Trainer now gives the following reasons why we want to practice and become more skillful at diving and receiving feedback.
 - By learning to give and receive feedback skillfully, we help ourselves and others become more effective as volunteers.
 - b. The more we learn about ourselves in this training and about how effective our behavior is, the more we will be prepared for our two years as an effective volunteer.
 - c. We will also become more sensitive to our reactions to others and the consequences of these reactions in our interpersonal relationships.
- 5. Trainer now asks group to break into groups of five and brainstorm ways in which we can become more skillful at giving and receiveing teedback and list ideas on newsprint.

15 minutes

5 minutes

5. Trainer now asks groups to present their list to entire group. 7. By way of summarizing, two trainer models for giving and receiving feedback through short role plays are used.

The feedback should be real, perhaps based on the record keeping exercise that they took part in. This would hel set a climate of openness. It is also inportant to modal positive feedback.

SESSION V

Record Keeping - More Group Process

Total Time - 2 hours 15 minutes

Goals:

- To establish the importance of record keeping, as scientists and as responsible Peace Corps Volunteers.
- a To observe group process.

Overview

This exercise is devoted to the importance of accurate record keeping not only during training but also as a professional habit during Peace Corps service. The groups will also look at its own group process.

Exercise:

- I. Record Keeping
- [I. Group Process

Materials

Flip charts, maker pens, tape.

CECCTON V

Record Keeping Evercise I:

Total Time: - 15 hours

Overview

The purpose of this exercise is to provide trainees with an opportunity to realize the importance of record keeping as a must during training, and also during Peace Corps service.

Procedure

Activities

1. Trainer divides participants in groups of five, asking that people get togethe with others with whom they have not

worked. Data Collection

2. Trainer gives the group the following problem posted on newsprint:

> What information would you need to know if you arrrived three weeks after an experiment in dermination was set-up in a nursery and you are expected to take over the experiment?

Trainer asks groups to make a list of all data they would need.

3. Have two groups meet together and

combine their lists.

4. Combined groups present to large group their combined data sheets.

Trainer's Note: The purpose of combining groups (making then large) is to have groups experience what it will be like in the field, having people with the same information, but articulating it in a different way.

- 5. The combined groups are now given the task of designing a record keeping form They must figure out how they can best do the task with such a large group. The form developed is put on newsprint.
- 6. Groups make presentations and critique each others forms.

20 minutes

10 minutes

10 minutes

Time

-60-

7. Trainer summerizes as follows using newsprint:

10 minutes

Data Sheet

- a. careful lavout
- b. easy to read
- c. easy to use
- d. all on one sheet if possible e. all data can be important
- 8. Trainer stresses once again the importance of keeping records during training.
- Move from this exercise directly into the "Group Process" exercise.

Exercise II -

Group Process

Total Time - 45 minutes

Goals:

- To explore the group process.
 - To understand collaboration

Overview

In this exercise experiential learnings and group collaboration are emphasized.

Procedure:

Time

Activities

- l. Each group is instructed to discuss observations of the group process, bot on a technical and interpersonal level Some questions that may stimulate discussion are:
 - a. What were the reactions of group members regarding various individual technical skill levels in the group?
 - b. Did people find it a help or a hinderance to work with people of different skill levels?
 - c. How were decisions made during the data/form making process?
 - d. What factors contributed to or impeded mutually shared decision-making
- 2. Trainer presents a summary of various styles in group decision-making, including
 - o the "pulp" o self authorization
 - handclasp
 - 0 baiting
 - authority rule
 - majority vote
 - 0 unanimous consent consensus
 - -62-

A short discussion follows concerning the potentially positive (satisfying) or negative (frustrating) consequences of each type of decision-making technique. Trainer should point out that all the styles, with the acception of consensus, often preclude the importance of the consequence of the conse

cooperation.

- Bach group meets to discuss the styles of decision-making that characterized their group during the record keeping exercise.
- Trainer guides a summary of group conclusions concerning decision-making styles and group cooperation. Some points for discussion are:
 - The perceived value of different styles to facilitate accomplishing a group task,
 - The reaction of group members to various styles,
 - Observations of ways to improve group dynamics during training,
 - d. The application of such experience to the role of the volunteer in forestry extension work.

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Journal Keeping and Setting

Total Time - 45 minutes

Overview:

This exercise reflects back to Session V and record Keeping As scientists, its important for participants to collect data caily and Keep a journal as part of their profession. Further, it is a key to recording information and provides a tool for trained to use once they have left the security of the training program. The journal can be used for project management and continued learning, as well as goal setting, planning and personal reflection.

Procedure

10 minutes

Time	Activities

2 minutes 1. Introduce the purpose of the sessi:

- Explain to the group (with the use of a flip chart) the following format for journal use. (Provide notebooks with tabs). Divide the journal into the following section:
 - weekly goals (for learning during training, then for tasks during volunteer service).
 - b. Daily activity log,
 - c. Community analysis questions as
 - d. Community problem analysis,
 - e. Personal reflections, personal
 - f. Scientific, climatic data,
 - g. Language words I hear and want to look up.
- 3. Ask the group to begin making their first journal entries by writing their personal learning goals for the week. Under each goal, try to write as many objectives as possible. Relate this back to the "responsibility for one's own learnin."

 Explain that there will be quint time every evening for a half bour of journal writing.

SESSION VII

Plawers, Seeds, the Reginning

Total Time:

Goals:

- To refresh the remoties of the trainess about flowering cycles, pollination, seeds, seed germination, seed dispersal, hasic seed storage and point out the lack of knowledge we have about seed germination and dispersal among rany tropical species. To instruct the traines in basic seed storage.
- o Enable trainees to set up seed collection records.
- o Conduct seed germination experiments.
- o Look at small group process.

Overview

This session is a raview of the flowering cycle and seeds from pollination to germination. It is necessary to start at the beginning here as root trainess will have studied these cycles in North America and need to see the differences, particularly in trujucal appecies. The trainess will also have "hands-on" trujucal appecies. The trainess will also have "hands-on" and setting up a simple experiment and keeping records etting up as simple experiment and keeping records.

Exercises:

- 1. Lecture on flowers & seeds
- 2. Germination experiment
- 3. Small group process

Materials

- o flip charts, marker pens, tape
 - o 20 different varieties of seeds about 300 or 400 in all
 - o small plastic bags
 - o hlotter paper or newspaper

SESSION VII

Exercise I

Flowers & Seeds

Total time - 1 hour

Overview

Many of the participants will have learned in North Americs chools the cycles of flowering and seed development. However, the purpose of this lecture is to refresh their memories and have then relate the cycles to the Latin American forests and trees.

Procedures

Time

Activities

 Trainer/forester states that this morning is a quick refresher for everyone and invites a botanist in the group to join in and add his/her comments throughout the lecture.

1 hour

It is recommended that the following outline be put on newsprint and trained follow it as lecture is given.

PLOWERS

- 1. Many different types.
- Complete flowers hisexual.
- Staminate (male) flowers and pistillate (female) flowers on same tree, monaecius (pines; Douglas-fir).
- Staminate and pistillate flowers occurring on separate trees (willow; poplar).
- Polygamo monoecius complete flower plus starinate and pistillate flowers on same tree (Buckeye).
 Polygamo - Dioecious - perfect flowers plus either starinate
- Polygamo Dioecious perfect flowers pado of the pistillate flowers (Buckthorn).

Note: All of the above type trees can hear seeds except the dioecious tree that produces staminate flowers.

FLOWERING CYCLE/SEED MATURITY FOLLINATION





Pollinators a. Wind

- h. Insects
- c. Hirds
- Others- mice, bats

penetrate the ovule and double fertilization occurs

unites with two polar nuclei to form

. Mature Seed

- A. Three six months after fertilization
- B. 1 year after fertilization Pine
- C. Some take more time

II. Formation

- A. Mature embryo embedded in endosperm (endosperm can be
 - small or absent).

 B. Seed coat (integument) forms around the ovule.

III. Embryo = Germ

A. Composed of:

- 1. Seed leaves Cotyledon nostly two (palms 1, pines 4+)
 - a) panufacture food or
 - h) have stored food
- 2. Bud Plumule
- 3. Stem Hypocatyl
- 4. Rudimentary root radicle
- 4. Kunipencary root ranicr

5. Seed Coats

- a. hard (Pines)
- c. leathery (Cypress)

IV. Types of Seed

- A. True seeds (from Pine)
- B. Dry fruits: fruit is seed (oak)
- C. Fleshy fruit (apple)

V. Ripening

- A. Chemical change
- B. Hardening
- C. Dry D. Color change

VI. Seed Dispersal

A. Wind

- l. light seeds
- Seeds u/wings
- 8. Mammals Birds
 - Rodents
 - 2. Animals

- C. Water
- D. Fish

VII. Seed Collection - Records

- A. Seed Maturity
- H. Ripeness
- C. When to collect
- early collection not ripe
 late collection few viable seeds left

D. Methods

- 1. climbing
- 2. clippers
 - 3. cutters
 - 5. logging
 - 6. hamboo poles
- 7. collect off ground 8. spread sheet below tree

B. Seed Extraction

- l. air drv*
- 2. oven kiln
 - depulping
 dewinging
- 5. floating
- 6. winnowing

*Note: Important in air drying that birds do not eat seeds.
Air drying is also the most used and practical method.

- F. Seed Treatment
 - 1. burning
 - 2. soaking
 - 3. hoiling 4. filing - soaking 5. cutting - soaking
 - 5. cutting soaking 6. tumbling - (with grit)
 - tumbli
 others

Internal dormancy (triggering internal chemical reactions) External dormancy (seed coat permeability)

@ Cermination

mile Diann

H. Seed Storage

- dry cold: In sealed containers: Pine (pino), Cypress (Cipres)
- moist cold: Oak (roble), Maple (arce)
- 3. room temperature:
- Acacia (acacia), Eucalyptus (eucalipto)

inutes 4. other possibilities

- a. partial vacuum b. dry freeze
- c. hole in the ground bury in sealed plastic bags.
- 5. how does nature do it? peat moss (turba)
- 6. small containers

SESSION VII

Exercise II Germination Experiment

Total Time: 2 hours

Overview

The purpose of this exercise is to give trainees "hands-or experience and to apply learnings from previous exercise. Trainees will also develop a record keeping system for their experiments which will reinforce learning from record keeping exercise of the previous day.

Procedures

Time

Activities

- Trainees are asked to form groups of three. Groups are given a variety of seeds.
- Groups are told that they are to figur out the best way to treat the seeds (scarify and/or stratify). They must decide three different methods with at least two varieties of seeds. They at told the species.

Trainer's Note: The purpose of this exercise is not to furnish all the materials trainees need, but to have them find their own boiling water, sand paper, finger nail files etc., at the train: site. Plastic bags, seeds and blotter paper are provided.

- Trainens are told to figure out a reco keeping system for the germination experiment.
 - Trainee/manager is identified; the groups are to report their data on progress of germination experiments to

15 minutes progress of germination experiments manager every three days.

Trainer's Note: Trainer or expert in seed management should present the most applicable procedures and record keeping system used for germination text. Obtain feedback on students' efforts

SESSION VII

Exercise III Small Group Process

Total Time: 45 minutes

Overview

The purpose of this exercise is to look at small group process as compared to larger group process of the previous day. We also make use of feedback skills.

Procedures

5 minutes

Time

Activities

- Trainers look at the process of their groups. They are told to give each other feedback on the following:
- 30 minutes a. leadership qualities
 - h. participation
 - c. what helped/hindered getting task done. Rveryone must get/give feenthack. While one is giving feenthack to another, the third trainee observes the guality of the feedback and gives feedback on the quality and skill used for giving/receiving feedback.
- Trainees are asked to compare working in a small group to working in a larger group.
 - Trainer lists on newsprint findings of various groups as to:
 - o things that are harder,
 o things that are easier,
 - o impact on individuals.
- 2 minutes

 4. Trainer points out the greater responsibility of human interactions as trainees work together and become more skillful.

SESSION VIII

Spanish Language Class

Total time: 1% hours

Overview

same as session four

Procedures

Time

Activities

14 hours

- 1. Conversation
- 2. Grammar 3. Sentence construction

Vocabulary

Interpersonal - entre personas Interrupt - interrupni: Compunication - communicación Skill - habilidad, maestria Behavior - comportamiento, conducta Positive - positivo Posur - podes, potestadas autoridad, influencia Posur - podes, potestadas autoridad, influencia Posur - podes, potestadas autoridad, influencia Posure - podes potestadas por primitivo Posure - podes potestadas por primitivo Polite - por podestadas por primitivo Polite - por persona persona persona por primitivo Polite - por persona persona

Non-verbal Communication

Total Time:

Goals:

- To identify ways we communicate verbally and
- non-verbally.
- To identify patterns of non-verbal communication.
- o To look at perceptions one has about one's non-verbal
 - To identify some implications of non-verbal communication for cross cultural effectiveness.
 - o To develop non-verbal communication skills.

Overview

This session explores communication as a process. Trainees will have received some non-verbal communications training previously. This session will reinforce those learnings and concentrate on building non-verbal skills.

Exercise:

- 1. "Messages" and lecture
- Reflections on non-verbal communications and observations of another.

Exercise I

Messages

Total Time: 45 minutes

Overview

We communicate our likes and dislikes; actually we communicate more non-verbally about relationships than we do in any other way. In this exercise we are going to communicate non-verbally only.

Procedures

Time

Activities

 Trainer announces that "we are going to try a game; the meaning of which we will discover later, trust me." The game is structured rather like charades except that one may not use charade-like signals (such as spelling with the fingers or using work conventions. Ever

5 minutes

is tun to see if you are becoming akillful at it.

2. In pairs, give each person a message on a piece of upper (see list below); then tell the group that they have three minutes to try to get the message across the control of the c

if you have played this game before, it

time. After first three minutes, switch so that the other person can try it out also. A sample list of messages follow (you may add your own but the message should include either an emotion or communicate something about a relationship, as well as to try to give a message about a thing).

Messages (have them written out On slip of paper):

a. "I'm angry because the goats ate my seedlings."

b. "I'm happy because your crew arrived to work today."

c. "I'm frustrated because you never

d." You can't understand me, and this frightens me."

e. "I'm surprised at your youthful appearance."

f. "I like you and want to be your friend."

y. "I'm weak (and submissive) and you are strong (and dominant)."

h. "I don't like not being able to talk."

 After the non-verbal experience, gather group reactions:

o What was that like for you?

o What was easy about it (i.e., what part of the message could you get)?

o What was difficult (i.e., what part of the message couldn't you get)?

4. Build a lecture out of group experience:

 How many of you know about non-verbal communication?

What is it? Give some examples.

What does non-verbal communication communicate?

o How aware are you of your own non-verbal message?

As trainees answer these questions, write down the answers on a flip chart and examine them with the group. At the end, the group and the trainer should arrive at a working definition of non-verbal communication which they can test out during the next week with each other.

30 minutes

SESSION IX

Exercise III

Reflections on Non-Verbal Communications and Observations of Another

Total Time: 45 minutes

Overview

The purpose of this exercise is to give individuals time think about how they communicate non-verbally. They can then decide if there is perhaps some new or different non-verbal behavior they would like to try out during training.

Procedure

20 minutes

5 minutes

Time

Activities

- Trainer lists on newsprint the following:
 - Body bearing 0
 - 0 Appearance
 - Tone of voice O
 - 0 lise of space
 - Content of language 0 O Gestures
 - Ornaments Ω
 - 0 Touching
 - ^ Facial expressions
 - 0 Spp11s
 - 0 Colors
 - 0 Sions
 - Other

Asks participants to take a few minu to write down how and what they thin! they communiate non-verbally in each of these categories.

- Ask participants to look over responto the non-verbal categories. Deterif there is some area of non-verbal communication they want to strengthe perhaps change.
- 3. Ask participants to choose partners which will he for the purpose of "observing each other" for a one wee period in order to learn more about non-verhal communication and the way are perceived by another. The task to "watch each other" during the wee whenever possible and notice how the other person uses non-verbal

At this point they may want to share with each other their responses to the non-verbal categories to have partners check-out their perceptions of how and what they communicate non-verbally.

4. Trainer says that at the end of the week, the same pairs will meet to noth provide each other foedback on how they some generalizations from the exprience about how people from our culture communicate non-verbally. Also, participants will be able to check their own that the control is a second of the control participants will be able to check their participants.

SESSION X

Basic Site Selection, Planning and Layout of a Nursery

Total Time: 4 hours

Goals:

- To introduce nursery teams and explain how and why the were chosen.
- Explore knowledge within group about nursery site selection.
- o Group experience in planning and layout of nursery.
- o Explore group process in an unstructured situation.

Overview

In this session trainees will be asked to plan a nursery. They will be divided into teams which have been chosen by trains and given the task without further instructions. It is during this assaion that the trainees' ingenuity and ability to organis is pushed.

Exercise:

- Factors to be considered in nursery sites and summary lecture.
- 2. Location of site and planning of nursery.

Materials

o Flip charts, marker pens, tape.

Nursery Site Selection

(Selección del Sitio para el Vivero)

Points to consider:

- Moderate slope (pendiente moderado)
 - a. drainage (drenaje) b. watering (reigo)
- 2. Good soil (buen suelo) A soil sample should be taken
- 3. Frost-free site
- (sitio sin peligro de escarchas)
- Protected from winds (protección contra el viento)
- No large trees near (sin arboles grandes muy cerca)
- 6. Near water (cerca de aqua)
- 7. Good labor supply (disposiblidad de mano de obra)
- 8. Transpotation close by (cerca de transportación)
- Permission of owner written (permiso por escrito)
- 10. Caretaker (cuidador)
- ll. Fencing (cercos)
- Not used recently as nursery (recentamente no usado como sitio para vivero)
- Sufficient size for anticipated seedling domand expansion (sufficients tomario para producir las necesidades futuras expansión)
- 14. No weeds (sin maleza)

Exercise I

Factors to be Considered in Nursery Sites

Total Time: 2 hours

Overview

Building on knowledge that the group has, the trainers wil attempt to determine factors to he considered in planning a possible nursery site.

Procedures

Time Activities

 Nursery teams are introduced. Trainer explains that teams have been chosen, a result of staff observations of how they have worked individually over the last three days. They are unchangeabl and non-negotiable. Strengthe have be taken into consideration as well as

10 minutes

Lastly, role models that we as trainer
falt others could hencefit from through
observation of their working styles,
estable the style of the style of the style of the style
groups they are as trainer
privately and will be given informatic

a forest nursery.

 Trainer instructs nursery teams to get together and list on newsprint those factors that they feel are important; the choosing of a site for establishie

 Group now makes presentation to large group and each presentation is questioned and discussed by

forester/trainer and other group memhers.

 Forester/trainer now presents summary lecture: He/she then puts the follow on newsprint.

45 minutes

30 minutes

8

 Forester/trainer explains that you will not always, if ever, find everything in one site. He then moves to next newsprint as follows.

Nursery Site Trade-Offs

What is really important?

2. With what can you live?

Forester/trainer now moves into planning the layout of a nursery.

Layout of nursery:

Contiguous group of seed beds to facilitate ease of working and irrigating.

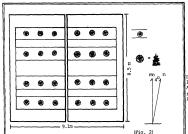
15 minutes

a. Built-up 15 - 20 cm,

b. 1-1.3 meters wide.

walkways: 40-80 cm - ease of access.

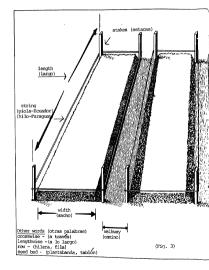
Peace Corps Nursery (Conocoto, Eduador)



Legend: 1cm - lm 2 Area - 77.35m slope - 5% Aspect - North

LAYOUT OF NURSERY

(TRAZADO DEL VIVERO)



OPPOTON V

Exercise II

Location of Nursery Site and Planning

Total Time:

2 hours

Overview

In this exercise, leadership shility to organize and ingenuity of grupp members is highlighted. Trainees are given rough idea of possible site location. Trainers leave area and are not available to group as they decide on site and draw up plan. Trainers return and review site plan and help group look at their computations.

Procedures

Time

Activities

 Trainer identifies area near training center, shows sketch map area, tell traines that they are to plan a vivero in that area somewhere. Instructions written are:
 Bach row will be 4 meters long, each

15 hours

vivero group will be responsible for one row.

Now plan the layout; when trainees have the vivero area planned, bring it to trainer and have it checked. All trainers now leave without answering any

Trainers return to center and ask to be told about the group process. Some possible questions are:

further questions.

30 minutes

- Who took charge of the overall project? How did they do it?
- What problems did they have or are still having?
- 3. Is everyone satisfied with the plan?
 - How did the vivero groups communicate and interact with each other?
- 5. How were decisions made?
- Trainer summarizes the morning activities.

PEDDION YI

Spanish Language Class

Total Time: 11 hours

Overview

Same as session four

Procedures

Time Activities

11000000

1½ hours 1. Conversation 2. Grammar

3. Sentence construction

Vocabulary

Moderate slope - pendiente moderado Drainage - drenaje

Watering - riezo

Good soil - buen suelo

Frost free site - sitio sin peligro de escarchas Protected from winds - protección contra el viento No large trees near - sin arboles grandes muy cerca

Near water - cerca de agua Good labor supply - disponiblidad de mano de obra

Transportation close by - cerca de transportación
Permission of owner, written - permiso por excrito
Caretaker - cuidador
Fencino - cercos

No weeds - sin maleza

SESSION XII

Cultural Values

Total Time:

Goals:

- o To get in touch with our own value system.
- To see what we have learned so far about host country cultural values.
- To explore commonalities and differences.
- o To find ways of accepting cultural differences.

Overview

In this session, trainees will be asked to list their own cultural values. For many this will be a repeat, but the purpose here is to see how many more of their own values they have identified since living in host country and to look at host country cultural values, so that trainees can begin to see commonalities and differences. Finally, trainees will be seeking ways to accept the differences. This lays the ground work for extension work training later in the program.

Exercise

 Cultural value explorations: mine, ours, theirs, acceptance.

Materials

Flip charts, marker pens, tape.

Exercise I:

Cultural values: An Exploration - Mine, Ours, Theirs, Acceptant

Total Time: 1 hour 45 minutes

Overview

To explore different cultural systems. Find ways to accept the differences.

Procedures

Time

Activities

 Trainer posts on newsprint the follow: diagram:

BELIEFS

5 minutes

CULTURE

VALUES

are not good or bad that they just ar The reason we want to take a good loc at our cultural values in this sessio is to start at just basically a very general point - culture. The unique lifestyles of a particular group of people is a learned behavior that is communicable. We are able to see two very key concepts of culture. It is communicable, thank goodness. It mea you can learn something about it. Because if it were not communicable. would have nothing to do here today (for the rest of your volunteer sorvice To learn about the behavior of others also very meaningful, not only in a social sense, but in a management ser because I think it is important for

people to understand the influence the environment has on culture, on you as understand that you are not "born" was culture. You can be born into a culture but you are not born a culture.

Give a brief lecture stating that wal

if I could make that distinction. Another positive aspect of learned behavior says to us that we can also not only broaden our appreciation of other cultures but broaden our ability to participate in other cultures, in another cultural miliau.

To start our participation in this culture we need to go back to ourselves and then come forward.

Trainer asks trainees to make a list of their own cultural values. You may have done this before so it will be easy. You may also notice that you have gotten in touch with values you were unaware of since coming to host country.

 Trainer now asks participants to form groups of four. Share their lists of cultural values and look for similarities and differences in their lists.

 Trainer now asks group to share their differences and write them on newsprint. Then asks for ways in which we accept differences in our own culture.

Trainer now asks groups to list as many cultural values of the host country as they can. Trainer asks that after they have completed this list, they once again check for commonalities and differences.

Trainer now asks the groups to make a list on newsprint of ideas they may have for accepting these differences.

 $\mbox{\bf Trainer's Note:}\ \mbox{\bf List generated from pilot program is included as a guide.}$

16 minutes

30 minutes

15 minutes

20 minutes

15 minutes

15 minutes

 Trainer now requests that small groups share with large groups their ideas. Trainer now leads discussion of how these ideas can be used in the volunteer experience.

Adjust to environment. Have respect for culture and customs. Cultural sensitivity. o

n Be outgoing.

0

o

0

٥ Empathy.

Introspection.

cultural.

values.

Patience. .

Se flexible enough to (tolerate, accept) values different

from our own.

Conformity/compromise.

Keep an open mind, culturally and personally. Good sense of humor (able to laugh at self).

Educate ourselves to explain motives for values.

Understanding that the differences are deeprooted and

Ability to modify outward behavior without modifying inway

Realize our values are as different to them as theirs to t

SESSION XIII

Soil Preparation, Seed Bed Sowing, and Reproduction by Clippings

Total Time: Approximately 4 hours

Goals:

- To define summarizing as a communication skill, and to make this skill explicit in participants' minds.
- To give information about soil preparation, seed bed sowing and reproduction by clippings.
- Review trainees plan for vivero. Have trainees start laying out nursery.

Overview

In this session information about soils is given as a retresher for some trainess and as new information for others. Participants' vivero plan is reviewed and trainer/forester makes suggestions and gives approval for participants to start laying have participants summarize where they are technically and realize the value of this skill in technical learning.

Exercise

- 1. Summarizing,
- Lecture on soil preparation, seed bed sowing and reproduction by clippings,
- Review of trainee vivero plan and laying out of vivero.

Materials: Flip charts, marker pens, tape, string, shovels, rakes, "Power in the Willow" article.

SESSION XIII

Exercise I: Summarizing

Total Time - 20 minutes

Overview

This exercise is designed as a short, quick energizer/change of pace and is used in conjunction with the technical training session. It is done by the technical trainer as a way of integrating a skill which can be used for technical learning. This is the first introduction of this exercise and it will be used later in the program.

Procedures

Time

2 minutes

Activities

1+.

- Technical trainer asks participants to check over the technical training of the past three days and try to prepare in their minds, a way to explain what has happened and what they have learned so that they can inform someone else about
- Technical trainer now asks participants to form into pairs, preferably with someone who has a different technical training experience (i.e., generalist with forester). One person explains his

5 minutes

- with forester). One person explains h technical training experience of the past three days while the other person listens and then summarizes his/her partner's presentation. Then people switch roles and repeat the process.
- Bring the group back together and discuss the experience by asking:
 - What if anything caused difficulty?
 How did it feel after you were speaking, then hearing the other person try to summarize your content?

10 minutes

- o What do you have to work on to be a better summarizer?
- o What are some of the advantages and disadvantages of summarizing?
- 4. Technical trainer asks group:

2 minutes

What can we say about summarizing as a communication skill?

Close by stating that we will return to practice summarizing as a skill from time to time in technical training and will also use it in language training.

ninute

Exercise II

Soil Preparation, Seed Bed Sowing, and Reproduction by Clipping.

Total Time: 15 hours

Overview

In this exercise, the technical trainer gives a lecture on soil preparation, seed bed sowing and reproduction by clipping. For many participants this will be a refresher session and the technical trainer should ask people to make comments about the session of the contrainer should be a session of the contrainer of th

for their information (article at end of this exercise).

Procedures

Time

Activities

 Technical trainer gives lecture using the following outline. It is recommended that outline be placed on newsprint and displayed as technical trainer teaches various stage of outline during the lecture. Newsprint outline helps hold attention.

SOIL PREPARATION

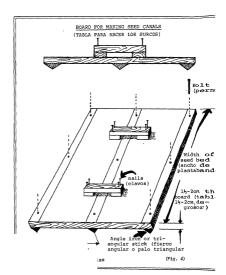
- 1. Soil might have to be sterilized if there exists a danger of disease by:
 - a. boiling Water
 b. acid treatment
 - c. heating soil on steel plate
- Might be better to move site,
- 3. Chemical sterilization,
- 4. Fertilization medium to be mixed with soil according to need,
- Organic material might have to be added to help retain soil moisture and/or improve texture. The following are possibilities:
 - a. compost
 - b. straw
 - c. chopped pine needles (dry)
 - 1. toxic effect?
 - 2. nutrient loss?

(Organic material could contain weed seeds and/or fungi or insects).

- 6. Mycorrhiza,
- 7. pH 6.5 (slightly acid).

SOWING

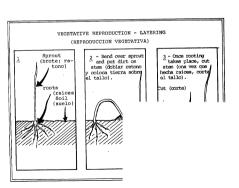
- 1. Across the bed facilitates weeding
- 2. Make your own seed "trench":
 - a. board b. depth of trench (see
- 3. Sow sand in seed trench (optic
- 3. Sow sand In seed Crench (o)
- 4. Sprinkle seed in trench,
- Number of seeds/meter:
 a. size of seedling,
 - b. plant species,
 - c. germination prospec d. 1 viable seed/cm.
 - d. l viable seed/cm.
- 6. Cover with sand or dirt,
- 7. Water heavily after sowing,
- You may put straw over beds moisture retention.



REPRODUCTION BY CLIPPING

- | Sprouts cut and stuck in ground (brotes)(retonos),
- 2. Redwood not effective,
- 3. More experimentation needed in hardwoods,
- 4. Rooting medium,
- 5. Other:
 - a. layering b. moss-soil (usago) around sprout (brote).
- 6. Willow sprout method,
- 7. Horticulture:

roots (raices)



COMMON evidenti



Is willow rooting

surpasses synthetic contains a sub-

its ability to stim plant harmones in can extract and use stance, which you

ate almost any

That means bard lant into rooting

long sought caline?

from only a third of an ounce of wil-low tong stimulated production of 12 times as many roots per mung bean cutting as controls in plain water. At the highest concentration tested, the mosting substance, menuunmatched by any previously known have the ability to stimulate rooting four or five roots. Alone, while control sections produced only two-ioch stem of mung bean cuttings produce more than 100 roots in the willow rooting substance could easily promoting agent. A crude extract it seems to ding plant available

scientific breakthroughs are the re-sult of accidents? I finally know why: If scientists could define what it is they're looking for, they'd have al-ready found it. It's when they're lookan accident. (Ever notice how Wooster, Ohio, calls his finding, was

An experimental team was using ng for something else that they find that they seek.) from our potting sheds and window

may be routinely

dips and woody ornamental bushes beech, cherry, pine and oak - to say

stance is a remarkably They share many characteristics, says Dr. Kawase. Willow rooting sub-

strong root

hing of vegetable cuttings, flower

Kawase, professor of horticulture at

agricultural research center in

The discovery of the "willow root-

Ď. Makota

g substance is not a plan

dinary numbers of roots. In tracing why, the scientists found the willow twigs were soaking to moisten soft-wood cuttings in a centrifuge. The softwood cuttings sent out extraorwater from a basin where willow

ooting substance - which may ton

peach and spirea.

Dr. Kawase says use of willow willow twigs and applied to the cutcombined with a water solution of 100 percent of them rooted When the hormones were also showed significant bittersweet, forsythia produced

to the time-consuming bedding and transplanting now needed for propa-gation of woody plants. Using it dur-ing routing transplanting of potted plant loss by stimulating new root growth. He even suggests we try it on rooting substance could mean an end fants could ease shock and reduce

such as a cup or mason jar. Cover with water and use a lid or plastic bag rooting substance at home, gather current-year willow shoots, remove the leaves, and cut the shoots into o prevent evaporation. Let it sit for bout 24 hours, then drain off the squid for use. is many as you can into a container, hort pieces - an inch or less. Pack To make an extract of the willow

For softwood or

herbaceous

ways were the easiest plants to root -Now that I think of it, willows alsarily roots well in water, try rooting plastic tent over the potted cuttings will prevent them from drying out. If ou're dealing with a plant that ordislace the cuttings upright in of them normally in soil. As usual, bout 24 hours have passed. Then tiner with willow extract in the bot m. Allow them to absorb the exadding more if needed, until a con-

se now we can transf em moist, and they take be stick slips in the ground

Exercise III

Review of Trainee Vivero Plan and Layout of Vivero

Total Time: 2 hours

Overview

In this exercise the technical trainer reviews trainees' vivero plan and provides comments about the process of arriving at the plan. Trainees will then proceed to the vivero site and start laying out their nursery.

Procedure

Time

Activities

Technical trainer reviews vivero plan.
Makes recommendations and points out
work that is excellent and that which is
the vivero will be their responsibility
during the rest of training. They will layou
prepare soil, sow seeds and keep the
nursery watered. No one will rewind
from time to time.

15 minutes

Trainoes are now instructed to go and layout nursery. They are aware of where tools are kept. No further instructions are given. Once again trainers become unawailable.

l hour 45 minutes

Trainer's Note: There will be more trainers than space with which to work. Groups will have to negotiate use of tools and space with each other.

5 minutes

 Trainers arrive and check out nursery layout. Observations are made ahout group work at the site. Nothing is said about process at this point. Trainers collect data.

SESSION XIV

Spanish Language

Total Time: 14 hours

Goals: same as session four

Overview

In this session, trainees should be able to explain to instructor the methods for laying out a vivero in Spanish.

Procedures

Time

Activities

1% hours

- Group explanation of laying out a vivero
 - 2. Grammar exercise
 - 3. Sentence construction

Vocabulary

Dig - cavar

Bare root - raiz desnuda Disease - enfermedad Drainage - drenaje Fertilizer - abono, estiercol, fertilizante Irrigation - riego Lumber - madera aserrada Nursery - vivero Sample plot - parcela de ensayo Raw - surco Run-off - escurrimiento Seedbed - plantabanda, semillero Site factor - factor local; calidad de rodal Soil - suelo Sowinu - siembra Shovel - pala, palana Rake - rastro, rastra, rastrillo

SESSION YV

Communication through Illustration

foral Time: Two hours

Goals:

- To show trainees simple drawing techniques.
- To have trainees understand the importance of being able to illustrate what they are saying verbally.
- Simple poster drawing techniques and use of other
- materials for making posters illustrated by trainer. then posters are made by trainees.

Overview

This session introduces the importance of illustration as a communication technique. In future sessions trainees will be expected to use illustrations as part of the presentations. The importance of using visual aids while talking to a group is also emphasized.

Exercises:

Communication through illustration.

haterials:

Flip charts, marker pens, tape, crayons, glue, old magazines, scraps of material, felt pieces, candy bars for prizes.

Exercise I

Communication through Illustration

Total Time: 2 hours

Overview

This exercise tends to be a lot of fun and the trainers have to keep a focus on communication aspects of the exactise. Volunteers frequently have to give charlas to school children, groups, and on formal field days. It is important that participants see the value of holding a group's attention through the use of illustrations.

memory).

Procedures

5 minutes

Time

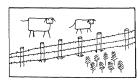
Activities

 Trainer introduces mession with short lecture about using visual aids. Explains that in the campo, the more sophisticated forms or visual aids are not available and trainees must rely on their own ability to make these aids. of newspirit during the program is employing a visual aid (implicit group employing a visual aid (implicit group

15 minutes

- Trainer now draws a series of stick figures on newsprint (may want to have light pencil outlines to go over). Traine now asks trainees to draw a set of stick figures of their own for practice.
- SAMPLE ILLUSTRATION for keeping cows out of field by fencing

1 hour



Trainer explains that it is O.K. to make people laugh by your drawings; as long as you get your message across. Getting people to laugh helps them remember. Trainer explains that we are now coing to draw a poster with a message about planting trees. Trainees are instructed to put time and thought into this project as they will have to do this many times during their volunteer service. Trainer tells trainees that there is a table of different materials that may be used for this project. Each trainee makes a poster. When they are done posters are to be hung on the walls. This is a contest and there will be prizes awarded. Awards will be given ont

- Best presentation of message.
- o Most creative use of materials.
- Heat effort by non-artistic person. ^
- o Honorable mention in the above categories.
- 4. Participants are asked to describe their posters if the message is not clear. Suggestions are given by both trainers and trainees. Trainer discusses the various design possiblities exhibited. Trainer states that all presentations during the remainder of the training program are expected to be accompanied by visual presentations. Therefore, materials will remain where trainees can have access to them.

5. Trainers and any quests you invite meet and decide on awards. Candy hars are diven out.

minutes

doutes

Fertilizers, Watering and Containers

Total Time: 4 hours

Goals

- To give information about fertilizers, watering and containers.
- Have trainees actually practice making paper containers and transplanting seedlings.
- Trainees finish soil preparation and possibly sow seed heds in vivero.
- o Give out weekly evaluation forms.
- To review group process and have trainess give each other feedback.

Overview

This assaion once again will be a refresher for some participants but uniquely different ways and types of fertilizers used will hold interest. Containers used in Latin America differ significantly from North America. Practice in making containers and transplanting into containers will be a new experience for each other feedback on working together. Weekly availation forms will also be given out no that trainees can fill them out and bring them to their individual interviews (Session 18).

Evercises

- (1) Lecture on fertilizers, watering and containers.
- (2) Making containers and transplanting seedlings into these containers.
- (3) Soil preparation and sowing of seeds in vivero.

Materials:

Flip charts, marker pens, tape, weekly evaluation forms, newspaper (for pot making), staplers, staples, potting soil, seedlings for transplanting into containers, seeds for vivero.

SESSION XVI

marcise I

Lecture on Fertilizers, Watering and Containers

total Time: 30 Minutes

werview

At the beginning of this exercise technical trainer will ske a few minutes to pass out weekly evaluation forms. He will shen invite those for whom this lecture is a refresher to add sortinent information based on their experiences.

rocedures

ime

Activities

iminutes

 Technical trainer passes out weekly evaluation forms. He asks that participants have them filled out by next day in time for interviews and states that these are an important part of the feedback needed by trainers.

5 minutes

Technical trainer now gives the following lecture using an outline posted on newsprint.

Fertilizers (Fertilizante)

Work from soil sample. Trainer describes ways in which to take soil sample and quantity needed for each host country soil lab processing.

- 1. Inorganic (inorganico)
 - a. NPK
 - N=Nitrogen (nitrogeno)
 - P205=Phosphoric Acid (acido fosforico asimable)
 - K20=Potash (potasa soluable en agua) X.83=K

Ratios 10 - 20 - 10

- b. Grea
- c. Sthers
 - 1. ammonium sulfate
 - ammonium suirate
 ammonium nitrate

2. Organic (Organico)

- a. compost: good if done right
- b. green manure
 - l. alfalfa (alfalfa)
 - 2. peas (arvejas)
 - 3. beans (frijoles) 4. cloves (trébol)
- c. manures
- usually low in phosphorus
 best to mix in soil
- Application
 - a. organic mix into soii
 - b. imorganic mix into soil or sprinkle on:
 - 1st application
 - 2. 2nd application after 6 weeks
 - do not fertilize during hardening off period (± final month before outplanting).

Watering

After sowing, "carefully" water heavily.

Generally, watering heavily every few days is better than watering lightly everyday.

"Look" at soil moisture.

In the last month, taper off watering to harden plants.

Containers

рев

- . Paper* . Plastic bags
- . Clay pots
- Better system
 - a. Direct seed into container

Advantages

a. root system remains intact, b. has good soil.

2. Disadvangages

a, bulky to handle,

b. poor root development,

c. costly.

Paper pots including labor is \S the price of using plastic ontainers.

Small Research Projects

1.1 Sameness: Try to keep all factors, that might influence the experiment the same. Examples of questions to ask about the experiment;

Seed Experiment .

a. Are the seeds that are being used from the same source?

Growth Experiment

b. Is the soil the same throughout the experimental site?

Planting Growing Experiment

c. Were all trees planted on the same day using the same methods, toole etc.?

1.2 Randomness: As a means of limiting the effects of unknown differences, experiment should be layed out randomly.

a. Rice-Beans scatter on a grid,

b. Number from a hat,

c. Telephone book - last digits of numbers,

d. Random number generator.

1.3 What is it you are going to measure? How? when? With what?

1.4 Tosting Hypothesis

1.5 Layout: A block design

a. Randomized blocks.

b. Buffer strips,

c. Replicates (generally 3 - 5 replications),
d. Number.

Example: Species Trial

Problem: It is decided to test 7 different species to see if any grow and/or survive better than Pinus radiate.

Measurements to take: (by year)

Note it trees are dead or alive

with: Note height of each tree.

rcise II: Making Containers

al Time: 1 hour

rview

This exercise gives trainees practical hands on experience Making paper containers and transplanting into them. If ining is done at host country Ministry of Agriculture nursery, y will have a potting shed with all of the equipment needed. not. a small notting shed can be created for the exercise.

ocedures

16

Activities

Trainer or potting shed "jefe"
 demonstrates the making of newspaper
 cylinder. Trainer now makes 10
 cylinders each.

minutes

Trainces take cylinders to potting shed where they are shown how to pack potting soil tightly and to transplant seedling into pots.

Trainer gives brief lecture on the advantages of paper pots.

*iner's Note: If possible, you can get the nursery "jefo" to we all instructions in Spanish and oversee the trainees in this ercise. You will then only need to translate information that we may feel trainees are not understanding. This gives trainees we experience of working with a host country person.

irections for making paper cylinder containers.

- Take a standard size sheet of newspaper fold in half, then told in half again.
- Roll folded paper around fingers to give cylindrical shape.
- 3. Staple top and hottom.
- Roll over fingers to make cylinder.
- Pack bottom tightly with potting soil using tamping stick.
- h. Transplant seedling packing soil tightly around roots, pack up to collar of seedling.

Exercise III

Soil Preparation & Seedling Sowing

Total Time: 25 hours

Overview

This exercise is meant to be the last formal time period allotted for work on the traines' vivero. However, if the weather and their own group process does not allow for the final seedbed sowing, it is possible to finish on the next day.

Activities

 Trainer starts with observation made by staff members as to how vivero groups have done while working together. Asks

trainees to verify these observations.
Observations are listed on newsprint.

Trainer asks vivero groups to come together and give each other feedback as

Procedures Time

5 minutes

		how they work together,
		how they feel about the amount of wor
		others have done/not done,
30 minutes		how they feel about the leadership in
		the group,
		how they feel they have worked with t
		vivero groups,
		how they feel shout themselves as a q
		now.
		110#1
	2	frainer asks group to call out adjectives
	٠.	that describe themselves and writes then
10 minutes		on newsprint. Talks about the importance
10 minutes		
		of feedback in the group process.
		Groups are now given instructions to
		finish vivero. Trainer asks who ie
45 minutes		keeping records but makes no comment on
		the answer. Trainers once again leave
		the vivero area, leaving seeds with
		trainees.

SESSION XVII

Spanish Language

Total Time: 15 hours

Goals: Same as session four.

Overview

Trainees continue to discuss vivero project. This session describes to instructor, various ways to fertilize the vivero. Watering methods and containers are covered also.

Procedures

Time 14 hours

Activities

- Trainees discuss fertilization, watering and containers in Spanish.
- 2. Grammar.
- 3. Sentence construction.

Vocabulary

Fertilization - fertilización Inorganic - inorganico

Nitrogen - nitrogeno

Phosphoric acid - acido tosrorico asimable

Potash - potasa soluable en agua Altalta - alfalfa

Peas - arvejas Beans - frijoles

Clover - trebol Fertilizer - abono, estiercol, fertilizante

Growth - grano Intolerant - intolerante Mortality - mortalidad

Packing (nursery stock) - embalaje

Plantation - plantación Plunting stock - plantas destinadas a la plantación

Pot (transplant) - maceta Seed tree - arbol productor de semillas

Spacing - espaciamiento Transplant - transplante

ansplant bed - plantabanda de transplante.

Protection and Record Keeping

Total Time:

TOCUL TIME

- Goals:
 o To give information about the protection of vivero from animals, disease, weeds and insects.
 - o To go over record keeping practices once again.
 - To have trainees decide on standard record keeping format.
 - To summarize week long activity of establishing a vivero.

Overview

This measion completes the technical training in establishing a forest nursery. Traines will have testablishing a forest nursery. Traines will have the satisfaction of having planned, laid out, prepared soil and finally sowed the seeds in their own nursery. Also record keeping is upon over and trainess decide on a standard format for keeping nursery records. Protection of a nursery is discussed in depth.

Exercisee:

- Lecture on protection and summary of week's vivero activity.
- 2. Record keeping practices decision making.

SESSION XVIII

xercise I:

Protection of Vivero and Summary of Week's Activities

verview:

This is the final exercise focusing on establishing a ursery. Trainer will give lecture on protection and summarize steps taken in the establishment of a nursery (there is additional time allotted in this session if nursery beds are not yet sown).

rocedures

Pime

Activities

1. Technical trainer gives lecture on protection from outline posted on newsprint. Outline follows:

Protection

Small animals (animales pequeños)

Wee'd control (control de maleza)

1. hoards (tablas)
2. burlap (arpilera)
3. straw (paja)

a. herbicides b. other

1.

5.

2. Large animals (animales grandes) a. qoats/sheep (chivos, ovejas, baorrego) b. pigs (chanchos) c. cows (vacas), horses (caballos), cattle (ganado) d. dogs, etc. (perros, etc.) 3. Birds a. sowed seed (la semilla sembrada) b. new seedling (la planta nueva) c. as control - insects (como control - insectos) d. bird control (control de aves) l. chemicals (quimicos) 2, screens (pantalla de tela metalica) 3. sling shots (honda) 4. tin cans (latas) 4. Disease - damping off a. pre-energence sterile soil 2. sun and sterile sand 3. keep pH moderately acid 4. boiling water b. in roots upper part of roots infected, plants fall over, stems turn watery inside. 1. water schedule i. less often ii, time of day iii. chemicals

c. weeding

- weed early: late weeding is very costly
 use in compost
- at use in comp

Insects (insectas)

- a. grub worm (eats roots)
- b. cut worms
- c. aphids
- d. nematodes
- e. spiders, mites, thrips

Exercise II

Record Keeping

Total Time: 1 hour 45 minutes

Overview

This exercise stresses the importance of record keeping: n what data the trainees have and how they are going to record it, Pinally, trainees will go through a decision-making process abox standardizing a record-keeping method and preparing a form.

Procedures

Time

Activities

1. Technical trainer starts this eassiont

saying "remember yesterday when I aske you who was keeping records for the vivero?" Trainer then makes remarks about the first exercise on record keeping and its importance. Trainer m has two choices; he can (1) congratula the participant or participants that have taken responsiblity for keeping records or (2) make the point that

10 minutes

10 minutes

parts of training build one on the Trainer now asks group what data they need to record for the vivero they have just established. Trainer records date titles on newsprint.

participants must take responsibility for keeping records, realizing that all

3. Trainer now says "I feel you are ready to decide on a standard format for recording nursery data. Please do so.'

Trainer's Note: No directions are given about procedure or how to break into group(s). Trainers remain in room and observe trained organizing the project.

other.

15 minutes

 Trainer comments on the organization process which he and other trainers have just observed. Ask for comments from trainees about their own feelings the last hour.

5. Trainer now makes remarks about data recording form, additions and/or delations.

10 minutes

SESSION XIX

Individual Interviews

tal Time: 15 minutes per interview

als:

- To give each trainee time with a trainer to go over the week's learnings.
 - To give training staff collective feedback from trainee.
 - To receive feedback from trainee on program and trainers' performance.

erview

The purpose of this session is to give each trainee, dividual time with trainer to go over their learnings of the ok. To give each trainee feedback from the staff hased on aluation criteria given to ethem in session one. To receive itten evaluation from trainees and to get oral feedback on saining program and trainers' performance.

ocedures

me

Activities

- Trainers divide group by number of trainers and assign trainers to each trainer for interview. List should be divided so that each trainee will be interviewed by each trainer at least onee during training program.
- Interview schedule is posted in training room.
- 3. Trainer interviews each trainee; first, by giving trainse feedback from steaf on assessment criteria and secondly, by giving weekly evaluation form a cursory glance to pick out areas that trainer may feel needs to be discussed. Trainer asks for feedback that trainee may have tor staff.
- 4. Immediately after last interview, trainers meet together and discuss interviews, highlighting potential problem areas. Trainer should report on trainees who they feel are of particular concern to determine what, if any response they made to staff as feedback.

Weekly:Evaluation Form

I have gained the following
On a scale of 1 to 10 my learning this week has been
This week has been (respond to all that applies)
informative motivating
a rehash
too much in too little time unnecessary valuable
valuable a waste of time
a stone drag
This week has (respond to all that applies)
challenged me reinforced my technical skills
made me more confident
enabled me to polish communication skills improved my group interaction skills
Reedback on the training program.

6. Feedback to trainers.

d like to see included in training program.

SESSION XX

Planting Trees

potal Time: 34 hours

overview

In this exercise trainees start at the nursery, watching the lifting, packing and transporting of seedlings. If possible, they am participate in this operation. They then transport trees to planting site. The planting plan has been done by one of the trainees under the supervision of the technical trainer. Each trainee plants trees and teaches a school child to plant a tree.

Procedures

Time Activities

- 1. Trainees go to nursery and watch
 seedlings being lifted, packed and put
 in truck for transport. Pick up tools
 for planting.
- Trainees now go to planting site where perticipant who has previously laid out 20 minutes plan for planting trees explains where trees are to be planted.
- 3. Trainees now plant trees. School children accompany trainees and also plant trees with the help of trainees.
 - Trainees return to training center and replace tools.

Trainer's Note: Technical Forester moves from group to group being sure children are integrated into each group. Trainer offers pointers on how to get children involved.

SESSION XX

Planting Trees

Exercise I Charla: Como Plantar

Total Time: 3 hour

.

Overview

This exercise is conducted in Spanish using illustrations to ensure that trainees understand the content. The purpose is for technical trainer to model an appropriate charla for instructing camposings in how to plant trees.

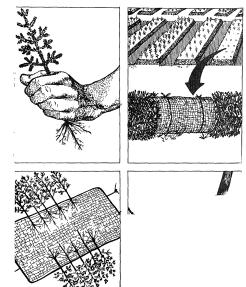
Procedures

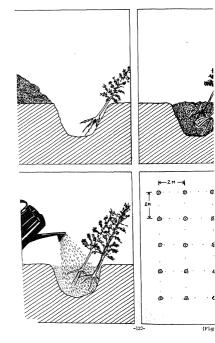
Time

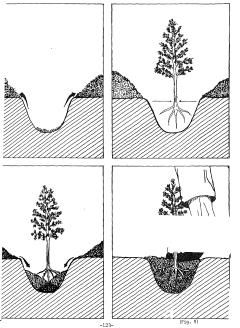
Activities

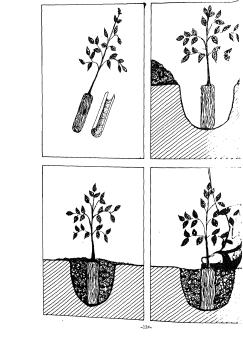
 Technical trainers draw the following series of drawings on newsprint. Then gives total lecture using Spanish.

Trainer's Note: This series of drawings can be xeroxed and made into a booklet that trainees can follow along with trainer during lecture.









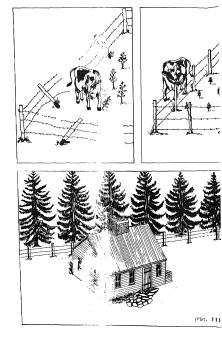








(Pig. 10)



SESSION XX

Planting Trees

tal Time

als:

- o To present an entire lecture in Spanish using
- illustrations.
- o For trainees to plant trees.
- o To help others plant trees.

erview

The technical trainer presents a lecture on the methods of anting trees in Spanish. The trainees will get a preview of the kinds of charlas they will be giving. Trainees will also lant trees and help others plant trees.

cercise

- l. Charla: "Como Plantar"
- Tree planting

aterials:

Flip charts, marker pens, tape, shovels, seedlings, (ready for outplanting).

SESSION XXI

Spanish Language Session

Total Time: 15 hours

Goals:

To learn Vocabulary associated with the planting of trees

Overview

During this session trainees will practice using words associated with the planting of trees. They should be able to prepare charla for their own use from this vocabulary.

Procedures

là hours

Activities

- 1. Prepare charla of tree planting.
- 2. Sentence construction.
- 3. Practice in grammar.
- 4. Vocabulary.
- Seedling plantula; planta de semillero
- 2. Wet down mojar bien 3. Heel in - poner en una trinchera pequeña y tapar con tierra;
 - barbechar 4. Roots - raices
 - 5. Root collar cuello de raiz; corona de raiz
 - Spacing espacimiento
 - 7. "J" root raices en forma de jota; raices doblados
 - 8. Air pocket bolsa de aire 9. Tamp - appretar la tierra
- 11. Fence post estaca, poste
- 13. Barbed wire alambre de pua
- 14. Lena firewood

-128-

SESSION XXII

Introduction to Extension

otal Time: 2 hours

oals

- To introduce extension work.
- o To give historical overview.
- o To look at specific goals of extension.
 - To begin the process of developing an extension agent.

verview

Bach trainee regardless of their job assignment will ventually become involved in forestry extension work. This session begins by giving the historical overview of extension work .n North America; then goes into "Six Axioms of Forestry Strangion."

Exercises

- Historical overview and some techniques used in the past. Lecture.
 - Six Axioms for forestry extension; small group discussions.

Materials Flip charts, marker pens, tape.

Exercise II

Six Axioms of Porestry Extension

Total Time 1 hour 10 minutes

Overview

In this exercise participants become familiar with the hy rules of extension work. Since extension work is such an unstructured activity, the extension worker will find that then are long periods of time when he/she feels as if he/she in not doing anything and is tempted to do more; he/she may also wonder from time to time, if what he/she is doing is actually advancing or retarding extension work in the community. In extension work the temperament and sensitivity of the worker influence to a lat degree how effective the work will be.

Procedures

Time

Activities

1. The trainer posts on newsprint the following axioms and speaks about war? one.

30 minutes

- The forestry extensionist should never do anything for people that they are able to do for themselve!
- The forestry extensionist should never encourage the use of rescutfrom outside the community until ; the resources within the community have been exhausted.
- The forestry extensionist should never try to organize people to te with a need they don't thomselves recognize (may have to educate first).
- The forestry extensionist's rank important dedication must be to the sound local progress of his/her community.
- Forestry extension must be carrieout from an understanding of the host culture and in terms of that culture.
- o The forestry extensionist role in his/her community is transitory.

It is tempting to add a seventh axion, which says that the above six should not be taken too seriously. If there is one single encompassing rule in extension work, it is that given the basis openia, the means ultimately are flexible ——— subject to variations according to appear to the compassion of the compassion worker well enough to follow them when possible and break them, if necessary.

2. Trainer now asks participants to hreak into groups of five and discuss ways into groups of five and discuss ways in the groups of the group

Ways to Be Successful Extension Workers

We are not alone communication -contacts know when to compromise positive attitudes diplomacy know where to start cultural sensitivity technical competence be objective be aware of problems don't push own ideas keep it simple be a Mr. Tree work with counterpart be a resource be a good example get along with officials impart knowledge follow up on what you do do not spread yourself too thin follow the six points of extension be aware of external and internal resources transfer a system work with people have a good reputation help others make decisions; do not do it for them build extension bridges action speaks louder than words maintain a sense of humor quality vs. quantity (do a few things well)

> Trainer now does summary of session: Emphasizing that trainees are becoming members of a historical tradition -extension.

be aware of group dynamics

Exercise I

Historical Overview and Some Techniques Used in the Past

Total Time: 40 minutes

Overview

During the introduction to extension it is important for trainees to understand that the extension movement has 100 yea of history. Though it may be a new concept in developing countries it comes as a tried and true system for helping farm Experiences are shared to help trainees get a picture of an extension worker as one who must interact on a one to one basi order to help a community develop.

Procedures

Time

Activities

- 1. Lecture on history of extension outl
 - 1862 Morrill Act Land Grant Colleges
 - 1887 Research Experimentation
 - 1914 Extension 0
 - 1940 1950 Good Neighbor Poli of Harry S. Truman, "Partners in Progress."

For extension to be most effective, it must achieve:

General:

- National concern to improve agrarian structures.
- Rural population with high level of self esteem. 3. Active participation in significant development programs, i.e., agrarian.

Specific Goals of Extension:

- Significant objectives precise, measurable, realis Appropriate image.
- Power legal, money, political.
 - 4. Institutional mystique.
 - Internal efficiency.
- Effective communication with public. 7. Coordination with other agencies.
 - 8. Democratic procedures.

- 2. Be a Mr/Ms Tree. In order for people in a community to know you and why you are in the community you must identify vourself. Any opportunity which arises. you should give away a tree. Some examples are:
 - birthdays
 - 2. thank you for any kindness 3. p.r. for yourself
 - 4. christenings
 - 5. just to be friendly

Trainer asks for suggestions from group at this point.

rainer's Note: This concept really catches the imagination of ne participants. If you know the story of "Johnny Appleseed." it its in well here. Trainer makes point that in order for people o associate you with trees you must advertise . It is important o remind trainees that any trees given should be personal gifts, ever use trees from nursery stock. This is also a good time for rainer to talk about their own experiences as extension agents r community development workers.

The Principals of Pruning and Thinning Learning How to Make and Use a Diameter Tabe

Total Time: 4 hours

Goals:

- To have trainees learn the principals of pruning and thinning.
- To have trainees understand the concept of a diameter tape and its use.

Overview

In this session, participants will come to understand the principals of both pruning and thinning of trees. They will have actual "hands on" practice in pruning trees and thinning a woodlot. Participants will make a diameter tape and learn how a use it. They will measure trees with diameter tapes before thinning.

Exercise

- 1. Pruning and thinning theory and practice.
- 2. Make a diameter tape and learn how to use it.

Materials

Flip chart, marker pens, tape, pruning saws, ban saw, standard oressmaker measuring tape (metric), indelible pens.

arcise I Learning How to Make and Use a Diameter Tape

tal Time: 1 hour

erview

A diameter tape is a simple tool for measuring the diameter a tree at breast height (DBH). The trainees will first learn w to make a diameter tape. After having made diameter tape, ainees will learn how to measure tree at DBH.

ocedure

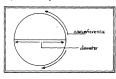
me

Activities

 Participant who has taken this on as a special project teaches other trainses how to make diameter tape. It is inexpensive and trainees can teach others how to make and use this tool. The directions should be similar to those listed below. Measurements are also included.

ascription

A dismeter tape, although it measures the circumference of a ree, is calibrated to read out the diameter measurements. The ree is measured at breast height (DBH); i.e., measure tree immeter at 4½ feet above ground level.



(Fig. 12)

Thus a tree that measures 135.09 cm in circumference has a diameter of 43 cm.

Method:

Using attached scale mark off dress maker tape every 3.14 cm with indelible marking pen. Allow to dry.

ter	Tape	C=# D
	1 =	3.14 cm
	2 =	6.28
	3 =	9.43
	4 =	12.57
	5 M	15.71
	6 =	18.85
	7 = 8 =	21.99
	9 =	28.28
	10 =	31.42
	11 =	34.56
	12 =	37.70
	13 =	40.84
	14 =	43.98
	15 =	47.13
	16 = 17 =	50.27
	18 =	56.55
	19 =	59.69
	20 =	62.83
	21 =	65.98
	22 =	69.12
	23 =	72.26
	24 = 25 =	75.40 78.54
	26 =	81.68
	27 =	84.83
	28 =	87.97
	29 =	91.11
	30 =	94.25
	31 =	97.39
	32 = 33 =	100.53
	34 =	
	35 =	
	36 ≃	113.10
	37 =	
	38 =	
	39 = 40 =	
	41 =	
	42 =	
	43 =	
	44 =	
	45 =	
	46 =	
	47 = 48 =	
	40 4	130.00

Diame

DAP Diametro altura de pecho (diameter at breast height [DBM]),

SESSION XXIII

The Principals of Pruning and Thinning ercise II

tal Time: 3 hours

erview

In this exercise trainees learn the principals of pruning d thinning. Trainees also practice actual pruning and thinning.

·ocedure .me

Activities

- i minutes
- 1. Technical trainee gives lecture on pruning and thinning with the use of saws and axes. If a trainee has extensive experience in pruning and/or thinning, he is asked by technical trainer to demonstrate proper techniques to other trainees. If no trainee has this specific experience, technical trainer does demonstration.

hour

2. Technical trainer now takes trainees to nearby stand of trees in need of pruning and trainees prune trees.

hour

- 3. Trainees also thin a few trees from a stand that needs thinning.
- 5 minutes
- 4. Technical trainer supervises trainess and summerizes at end of exercise.

Explanation of these activities is outlined on the following pages:

(xercise).

laterials: Bow saws, axes, diameter tapes (made

PRUNING (Poda)

Objectives of Pruning:

- 1. to produce knot free wood,
 - 2. to allow easy access to the forest,
 - 3. to decrease fire hazards,
 - 4. to increase value of stand,
 - 5. to improve the aesthetics of the forest.

Products - Firewood

Advantages:

- 1. make clear wood production,
- less taper in tree,

Disadvantages:

1. growth rate decrease.

Mathods

- It is best to use a pruning saw attached to a pole if higher limbs are to be cut.
- Use an ax or a machete (on lower limbs) only if worker is really proficient in the use of these tools. Limbs must be cut flush with stem of tree which requires great skill with a machete or an ax.

Pruning - percent of crown to be removed



(Pig. 13)

Pruning - cut should be flushed to the hole of the tree.

(Pig. 14) Pruning limb limb undercut

Undercut - to avoid stripping bank off tree trunk.

POSSIBLE PRUNING SCHEDULE

Schedule depends on:

- 1. species
 - 2. growth rate (site)

Example

1st	pruning	age	6 -	7 yea	rs
2nd	pruning	age	8 -	9 yea	re
3rd	oruning	age	10 -	- 12 v	ears

Economic considerations:

- 1. For what products are the trees being grown?
 - Are prices for pruned trees (or logs or lumber from pruned trees) higher than for unpruned trees?

THINNING

Objectives:

To provide growing space to selected trees (crop trees that these trees have the highest annual growth increment possible.

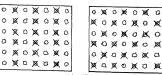
Products:

- 1. firewood
- 2. pulpwood (or wood for chips)
- posts
- 4. poles
- 5. rafters 6. small saw logs

Methods - mechanical (systematic)

1. row removal

2. removing every other tree



(Fig. 15)

- Either system removes } the trees.
- Both systems can easily be used on young trees. 0
 - Easy to implement and supervise.

Marking for Thinning

pending on local custom either "leave" or "take" trees are rked. Trees are usually marked at eye level and on stump (all rks facing the same direction).

- a. Ax markings are easy, but they can easily be changed.
- b. Paint is better but more expensive.

There should be very close supervision of cutting and removal work.

Loggers tend to want to remove as much volume as possible.

+ X Method

The average diameter in inches + some factor (X=1 to 8) is rual to the average spacing as expressed in feet.

Example:

Average DBH=12*

factor=6

Average spacing should be 18 feet between trees.

good marking method should consider:

- crown growing space.
- 2. position of tree in stand structure.
- 3. defects: rot, top breakage, forks, crook, etc.,
- 4. root space.
- 5. openings in stand.

.t is best to leave dominants and codominants with room to expand their crowns; remove intermediates, supressed and defective trees. If a systematic thinning was planned with two thinnings per rotation, the results might be the following: (consider a plantation originally planted 2 meters by 2 meters; 2500 crees/meters).

- Removing every other row would leave 1250 trees/hectare spacing 2 meters by 4 meters.
- Removing & the remaining trees would leave 625 trees/hectare with spacing of 4m X 4m.
- It is generally thought that there will be between 600 700 crop trees per hectare at the final harvest, however this depends greatly on the species used.

Beconomics of Thinning

Costs:

marking falling & bucking yarding & loading transport administration

Total Costs

Price of Materials

price of material

Total Cost Profit

- o The largest cost will probably be transport. The closer | market, the better.
- Keep yarding costs down by keeping maximum yarding distan small as possible (±200 meters to loading site).
- If labor is cheap, hand falling and bucking might be less costly, although slower.
 - If machinery is expensive, using animals for yarding will probably be less costly, although slower.

SESSION XXIV

Spanish Language

stal Time: 13 hours

erview

In this session, trainess will use vocabulary words that train to pruning, thinning and measuring trees. Trainess will yeelog sentences around the need related to pruning and thinning, this session the charle is introduced and participants try sking a simple charle on thinning or pruning that could be given the field.

rocedures

ime

Sentence structuring.

Activities

& hours

- 2. Vocabulary practice.
- Making up a simple charla using vocabulary words and instructions from Session 23.

Vocabulary

hovel - pala uncket - balde loe - azadón 'zuning - poda lo prune - podar hinning - raleo lo thin - rolear stand (thr) - rodal lample - muestra fost - anas pala Plot - parcela Zrown - copa Mx - (el) hacha Knot - nudo
Stump - ceps, tocón
Wedge - cuna
Wedge - alcura
TO GUL - alcura
TO GUL - alcura
TO GUL - bodgue
Franch - rama
TO fall (thr) - tumbar
Dissert - cuna
Dissert disserto
TO buck (into logs) - trozar

Test plot - parcela de ensajo

Swery other tree - arbol por medio; passado un árbol Swery other day - día por medio; pasando un día. DBH - (DAP), diametro altura de pecho Windbreak - cortina rumpeviento; cortina cortaviento Windbrow - arboles caldos par effecto de viento. Power Sow - sotoelera

Volunteer's Role as an Extensionist

Total Time: 24 hours

Goals:

- Examination of the roles of an extensionist.
- O Exploration of ways in which to introduce innovations to
- o Practice in communicating with community people
- regarding an innovation.

 To examine communication skills, verbal and non-verbal

Overview

In this session, seven roles are isolated in the process by which a volunteer in the role of an extensionist introduces the concept of tree planting to his/her community. The erea of communication is brought up again and skills that volunteers used are focused on. The non-verbal observation assignment from the their observations over the past veck.

Exercise I: 1. Extensionist roles.

 Communication skills - verbal and non-verbal, of an extensionist.

Materials

Flip charts, marker pens, tape.

ercise I: Extensionist Roles

tal Time: 1 hour 20 minutes

erview

In this exercise we look at the seven roles of an extension orker. Trainees discuss ways in which they can adopt these roles s volunteers doing extension work in their companities.

cocedures

ima

otes:

Activities

- Trainer introduces the following seven roles and gives an explanation of each:
 - 1.1 Develops need for change.
 - 1.2 Establishes a change relationship.
 - 1.3 Diagnoses the problem.
 - 1.4 Creates intent to change in
 - community members.
 - 1.6 Stabilizes change and prevents
 - discontinuances.
 1.7 Achieves a terminal relationship.
- TIT HOMEOTOS & COLINITIAN FOLIACIONANI

For trainer's discussion use local examples to illustrate each role.

1.1 Develops need for change - A volunteer is often initially required to help his/her community , become aware of the need to alter their behavior. The behavior in this case is either planting trees, or the preservation of trees. This is especially true among campesings whose potentials have not been realized and workers regist change. The unwillingness to accept change readily and other institutionalized behavioral patterns often result in the volunteer serving as a catalyst in the community. In order to do forestry extension work the volunteer points out new alternatives to existing forestry problems, dramatizes these problems and convinces campesings that they are capable of confronting forestry problems. The volunteer acting as

an extension worker not only assesses the community at this stage but also helps to create these needs in a consultative and persuasive manner.

- 1.2 Establish a change relationship Once the need for change is created,
 the volunteer must develop rapport
 with the community. He shade manages
 his/her relationship an impression
 of credibility, trustworthiness, and
 empathy toward their needs and
 problems. Communities must trust
 the volunteer worker before they
 proposes; the innovations he/sha
- 1.3 Diagnosis of the problem The extension worker is responsible for analyzing his community's problems/situation in order to determine why existing alternatives do not meet the community's needs. In arriving at his/her diagnostic conclusions, the extension worker must view the situation empathetically from the community's point of view and not his/her own. The volunteer extension worker must psychologically place themselves in their situations, put him/herself in their shoes, see their lives through their eyes. This empathy transferral is difficult.
- 1.4 Creates intent to change in community members After the volunteer explores various avenues of action that higher community might take to achieve their goals, he should encourage an intent to change, a motive to innovate. But the change must be community-center rather than for change for the sake for the continue of the continuer of the cont
- 1.5 Translates intent into action The volunter now seeks to influence his/her community's behavior in accordance with his recommendations which are based on the community's needs. In essence, the volunteer works to promote compliance with the program he/she advocates.

This means more than simple agreement on intent. It means action or behavioral change.

- 1.6 Stabilizes change and prevents discontinuances "Volunterer may effectively stabilize new behavior by directly reinforcing messages to those community members who have adapted, thus "freezing" the new behavior. This assistance frequently is given when the frequently is given when the continuation function in the chimovation-decision process.
- 1.7 Achieves a terminal relationship The end goal for the volunteer extension worker is development of salf-rementing behavior on the part can be part of the part of the

(The above 7 roles have been adapted from: Communication of Innovations by Rogers & Shoemaker)

40 minutes

15 minutes

or 20 minutes

- Trainer now asks group to form into small groups and envision the seven roles of an extension worker as objectives they have set for themselves and then come up with action steps to achieve these objectives. Make a list of these steps on newsprint.
- Small groups now share with large group their action steps.
- Trainer now does a summary of the presentations and introduces the next exercise.

CESSION YYU

Exercise II: Communication Skills - Verbal and Non-verbal, of an Extensionist.

Total Time: 1 hour 15 minutes

Overview

In the preceding exectise we have looked closely at the seven roles that an extension worker plays. Now we want to lock at the kind of communication skills a volunteer will need to carrout extension work. In this exercise, we also process the seasi of the previous week by discussing, generalizing and applying the experience accumulated the exercise process of the experience accumulated the exercise process of the exercise which we have been cheen. Then the participants give each other feedback on what they saw each other doing, discuss observations and arrive at some working assumptions/generalization about how non-weehal communications may be the most important ps of their communications system in the early days of their communications system in the early days of their communications.

Procedures

Time

Activities

5 minutes

 Trainer asks participants to list various kinds of communication skills they are going to need to carry out their role as extension workers.

5 minutes

Trainer now asks participants to call out skills and lists them on newsprin while they are called out.

3 minutes

- 3. Trainer makes general comments about skills traines have not identified. non-weehal skills have not been listed trainer adds and makes the point that the early days of volunteer service participants will send out many non-weehal messages that will be his, first impact on communities.
 - 4. Ask the group to form into the name pairs that have been observing each other for the past week and spind a other for the past week and spind a observed each other doing in torre o non-worbal communication during that time. This should serve as a way for individuals to gain insigne into he individuals to gain insigne into he which they may not be aware of.

- Bring group back together and draw out some generalizations from the experience of observing each.
 - Ask each pair to get with another pair and discuss the following questions. Discussion questions should be posted on flip chart.
 - o Did any of you learn anything new
 - o Is there anything about non-verbal communications in general that you have learned from the experience?
 - o Have you any ideas on how you can use non-verbal communication as an extension worker? What are they?
 - Trainer now asks for comments from participants on communication skills. He then summarizes the verbal and non-verbal skills that an extension worker needs.

15 minutes

minutes

SESSION XXVI

Pacing, Plane Table, Rustic Transit and Compass

Total Time: 45 hours

Goals:

- o Learn how to use a plane table.
 - o Learn how to use rustic level.
 - o Learn how to pace.
 - Learn how to use a compass.
 - o Learn how to make a simple traverse.
 o Learn simple method for calculating area.

Overview

CAGLAIGA

In this session trainees learn several forestry techniques. Trainees will demonstrate special projects they have completed; i.e., plane table and rustic transit. Participants learn how to pace, how to make a simple traverse and how to calcuate area.

Exercises:

- plane table
 rustic level
- pacing
- 4. compass use 5. simple traverse
- 6. simple calculation

daterials:

- 1. Plane table (made by trainee),
 2. Rustic transit level (made by trainee),
- 3. Compass (you will want to ask anyone who has a
 - compass to bring it to the session),
 - 4. Two (2) meter long sticks for trainees, 5. Bright colored flagging (surveyor's plastic
 - Bright colored flagging (surveyor's plastic flagging),
 - 6. graph paper.

SESSION YYUT

Exercise I

Plane Table Survey

Total Time: one half hour

Overview

Quite often, Peace Corps volunteers are called upon to assist in orders amap of an area. Sometimes sophisticated surveying equipment is not available or the volunteer does not understand how to use it. One solution to this problem is the plane table survey. This is a simple method of mapping an area utilizing a plane table, graph paper, common pine and a rubber utilizing a plane table, graph paper, common pine and a rubber commonstration. Bere in this exercise the plane table method is demonstrated and participants learn its uplane table method is

Procedures

Time

Activities

- Trainee introduces his special project to group. Demonstrates its use. (Sample follows)
- Trainees will later in this session practice using plane table.

PLANE TABLE SURVEYING

Ouite often, Peace Corps volunteers are called upon to assist or draw up a map of a certain area. Sometimes, sophisticated surveying equipment is either not available or the volunteer does not undextand how to use it.

As a solution to this problem a plane survey table (fig.16) can bused. This is a simple method of mapping an area utilizing a plane table, graph paper, common pins and a rubber band.

The pager is laid on the table. Next the table is placed on one of the correr of the area to be surveyed. After leveling the table (you can use a small inexpensive carpenter's level), stick pin in the pager in the correr corresponding to the corner of the traverse where you are (i.e., SW corner of traverse corresponds the bottom left of your paper).

Next take another pin and using the first pin as the backsight, line the second pin $\underline{u}\underline{v}$ with the next corner of the traverse. To determine the distance, you can either pace the distance or use a measuring tape. Using a scale (lcm=10m) draw the line between the pins and you have your first leg of the traverse. (fig. 4)

Next go to the corner which you just measured and set up the plane table there (do not forget to level the table). Line up both plan so that the line of sight through these pins is the line you just measured. Then turn and using the pin for the point where you are corner (tunning point). You would open at this process at overy corner of your survey until you've completed the traverse.

Any buildings or other points within the traverse could be included by "shooting" a line to each corner of the building using the method described shows.

with this process you actually draw the map as you go along and you need not rely on a compass for your work.

Once you have the map completed, you can determine the area in one of two ways. First, if you used graph paper, you could count the blocks to determine the area (if you drew the map to scale you could determine the area in one block of the graph paper).

ane Table Surveying

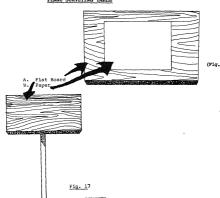
- e advantages of a plane table are:
- 1. Easy to build
 - 2. Easy to use
 - 3. A cheap system to determine area

e possible disadvantages could be:

- 1. Could be heavy and cumbersome
 - 2. Wouldn't be as accurate as a transit
- 3. Weather could play a determining role (i.e., rain)

ith the materials available virtually throughout all the veloping nations of the world and the cost so low, there is no ason why with some practice, we could not be able to map an area f land if called upon to do so.

PLANE SURVEYING TABLE



PLANE SURVEYING TABLE

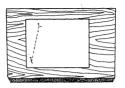
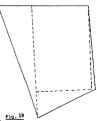


Fig. 18

1. Pine
2. Line of Sight
(leg of traverse)



Area of right triangle = jbh
Area of rectangle = 1 X w

exercise II

Rustic Level (Ceuvas de nivel)

rotal Time: one half hour

overview

Planting along the contour is an agricultural practice used in erosion control. Rustic instruments can be constructed easily and cheaply. In this exercise, one such instrument, the rustic level is demonstrated.

Procedures Time

Activities

- Trainee(s) introduces special project to group. Demonstrates its use (sample follows).
- hour 2. Traines will later in this session, practice using a rustic level.

RUSTIC LEVEL FOR CURVAS DE NIVEL

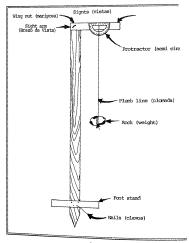


Fig. 20

Demonstration on Curvas de Nivel

re are the materials necessary for construction of this rustic rel. Its uses are for designing contour terracing for soil main control and other land surveys.

terials

```
Board 4 cm (h) X 3 cm (w) X 2 cm (l).
Pole 2m long (hamboc is good for this)
Small piece of wood 2 cm (h) X 4 cm (w) X 40 cm (l)
1 wing nut, 6 cm long
Nails
1 protractor
1 plumb line
1 pl
```

CURVAS DE NEURI.

seem "Curvas de nivel" is translated into English to mean mutur lines. Plowing along the contour is an agricultural ractice to aid in erosion control. By plowing with the contour, li erosion can be raduced by as such as 50%. "Curvas de nivel" to be such as the control measures as a such as the control measures in as still cropping, crop totalion, agricultural to the said the said times and diversion terracial.

iversion terraces are a widely used method in South America to the surface runoff and allow its safe exit from the field. The irraces are constructed along the contour at intervals down the logs of the land. The terrace is raised to a height of 50 - 70 with a width of 1 meter. The up slope side of the terrace has channel 30cm wide and 30cm deep which cathes surface runoff, and the surface runoff of the field. The channel slope is the content of the content with a low rowing upwars to reduce erosion in the channel. So

Laving out the "Curvas de Nivel

- 1) The first step is to measure the slope of the field in degrees or percent. The steepers of the slope will determin distance between terraces. The steeper your slope the closer terraces, the less your gradient the farther apart the terrac Slope can be measured using a protractor, abney level or survivel. The protractor will give degree slope while the latte will be two percent slope. Tables are available in most area which indicate terrace spacing in relation to slope and eoil
- 2) After determining slope and the terrace spacing the mark can be started. Start from the highest point in the field an measure down the slope of your calculated terrace interval to first point. It is important to always measure this distance directly down the slope. This direction may not coincide down border of the field. If this distance is not measured direct. down the slope, your terraces will not have uniform distances (down the proper thanks of the slope of

When you arrive at point "C", you measure to your next terrace point "D", directly down slope.



(Fig. 21)

Using the rustic instruments, points can be marked every 10 or maters. The points are marked by driving a stake into the gro Using a surveyor, level points can be placed every 30 - 35 met A helpful way to measure these distances is to tie a light weirope between the sighting instrument and the sight rod.

Once all the contours are marked you will see that some stakes not be in line. It will be necessary to adjust some points in order to have a smooth plow line. For example a sharp V in the contour will cause water to collect and leak through the terra. It will also be harder for the farmer to plow his field.

3) The terraces can be constructed with tractor, horse, oxen hand. The tractor is most efficient because it can throw more soil. When using animals, it is necessary to follow up with he to raise the terrace and also deepen the channel in front.

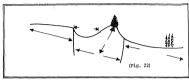
a actual plowing is done by throwing soil toward the stakes on the the uphill and downhill side. With a tractor two passes on the side is usually sufficient. With animals 3 - 4 passes on the side are recommended. With either method the last pass ould be on the uphill side to clean out the diversion channel.

Wegetation should be established as soon a possible. Bunch asset can be planted from cuttings or by seed. The grass in the version channel can be seeded or left to natural weeds growth, ess can also be planted on the terraces in conjunction with the nch grasses.

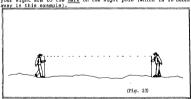
SOME WAYS TO USE YOUR RUSTIC TRANSIT

Nostly you will be using this level to aid you in making contox level terraces (curvas de nivel). These are for the protection soil in crop fields. This method is not recommended for over ! slope.

Example: This is a Curva de Nivel



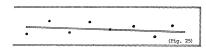
You take your rustic transit (transito rustico) and sight out & your sight arm to the mark on the sight pole (which is 10 meters



You have the man move up or down the slope until you see your month the sight. Then he puts a stake in that spot, and then its on to the next mark. Fairly soon, you would have atakes all along the contour of the slope for that particular terrace (curvas).

(Fig. 24)

-160-



of these are 10 meters apart.

 $\delta\omega$ want to make an average line out of these stake markers rause it would be too hard to work, and puddles of water would ther in the pockets.

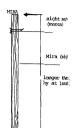


Fig. 26

RUSTIC LEVEL (MAQUINA)

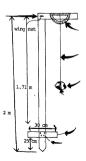


Fig. 27

me ways to use you rustic transit

so you can incorporate a drainage slope in your curvas de nivel; is would be to disperse water caught in the dithe of the curvas nivel. For example, you decide on .5% slope for drainage. For exy 18 slope at 10 meters distance from sight pols to rustic vel you nove your mark on sight pols up to the dispending which the contract of th

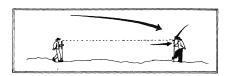


Fig. 28

or .5% slope, drain off channel, move sight line 5cm every 10 stors between the two men (up or down depending on which way you ant water to run), towards sight man or "maguina" man.

'ou can control 50% of your erosion, just by running your rows of rops along the contour line which does not need to be long.

The tollowing Peace Corps Volunteers contributed to this exercise: Michelle Myers, Jacob Fillion and Jim Storandt.

Pacino

Total Time: one half hour

Overview

Pacing, if done correctly can be used to get good dist measurements. Technical trainer instructs trainee in method pacing and how to measure distance by pacing.

Procedures

Time

Activities

- 1. Technical trainer gives lecture on 15 minutes pacing and gives instructione in t a pacing stick (post on newsprint)
 - Trainees figure out their pace and 15 minutes pacing stick for themselves,

Objectives: To teach trainees how to measure distance by pa

Pacing

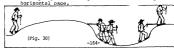
Pacing if done correctly can be used to get good distance measurements.

Methods for developing pacing skills:

- Lay out a base line 20 meters long.
 - 2. Walk naturally along base line to determine how many paces you take for 20 meters (1 pace=2 steps).



- 3. Cut a stick the length of your pace.
 - 4. On flat ground you can pace naturally keeping track of every 20 meter interval.
- 5. On slopes you can use your stick to measure your



cing Examples

- My pace: (2 steps) = 1.6 meters. (My stick is 1.6 meters long),
- My pace for the 20 meter baseline = 12.5 paces.
- 62.5 paces = 100 meters.

:xiner's Note: Although pacing is not widely used in the U.S., is desirable for PCVs to know this method for use in developing untries and to be able to teach the same.

. When actually pacing off an unknown distance, put out a finger, rpick up a stone or stick to keep track of every 20 meter agment. Total distance can easily be calculated in your head.

Example: At the end of an unknown segment I have 3 stones in my hand and 4 paces more.

3 X 20 meters = 60 meters

4 X 1.6 approx equals 4 X 1.5 = 6 meters

Total Distance = 66 meters

SESSION XXVI

Exercise IV

Compass

Total Time: one half hour

TOTAL TIME

Overview

Some of the participants will not have been instructed in the use of the compass. Those who know how to use a compass will assist other trainess in learning its use.

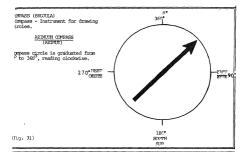
Procedures

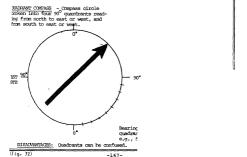
Time

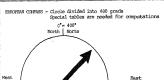
Activities

15 minutes

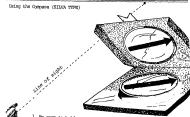
- Trainer lectures on use of compass. On newsprint, show the Azimuth compass, Quardrant compass and the European compass and their use.
- 15 minutes
- Trainees who do not know how to use compasses practice aided by trainee who knows how to use them.











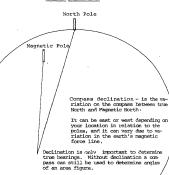
Be sure to hold cornass level so that needle swings free.
 Sight on stake and turn compass dial until red needle lines

parallel to black arrow.

3. Read bearing on dial.

(Fig. 34)

COMPASS DECLINATION



Exercise V

Simple Traverse

Total Time: 1 hour

Overview

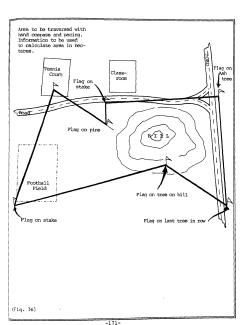
This exercise gives trainees a chance to use pacing skills and compass to run a simple traverse.

Procedures

Time

Activities

- Prior to this session, forester trainer stakes out an area on which traineos practice. Forester trainer uses flags to mark points. The area selected should have some steep slopes.
- Trainees are divided into groups with at least one forester trainee in each group.
- They go out and run a traverse using hand compass and pacing.
- Upon completion of traverse, trainees plot the area on graph paper and calculate the area.



Evercise VI

Simple Calculations

Total Time: 1 hour

Overview

To teach trainees a simple method of determining approximate land areas is the objective of this exercise.

Procedures

Time

activities

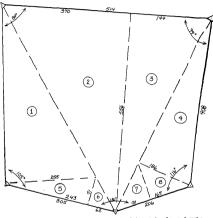
- 1. Porester trainer gives lecture on area calculation and posts the following on newsprint.
 - 1.1 plot out traverse to scale on sheet,
 - 1.2 break down traversed figure into right triangles and/or rectangles,
 - 1.3 calculate each area in right triangle and/or rectangle.
 - 1.4 total all calculations,
 - 1.5 divide by 10,000 to get hectares,

Area Formulas

Area of right triangle = %(base)(height) Area of rectangle = (hase)(height)

- 1.6 can check by counting squares on graph paper.
- 2. Porester trainer continues with lecture on area traversé record keeping. Displays the following example.

EXAMPLE OF CALCULATING AREA BY BREAKING AREA FIGURE INTO RIGHT TRIANGLES



how traversed figure to scale on graph paper. Break into triangles and scale of distances.

l. ½ (512) (255) = 65,280 ^{m2}
2. ½ (310) (556) = 86,180
3. ½ (144) (556) = 40,032
4. ½ (186) (408) = 37,944

TOTAT AREA = 251,314 ^{m2}

5. ½ (71) (243) = 8,505 ^{m2}
6. ½ (62) (71) = 2,201
7. ½ (99) (84) = 4,158
8. ½ (84) (167) = 7,014

251,314 m2

(Fig. 37)

10.000 m2/ha = 25.13 hectares

Area Traverse

Keeping records - what, again?

Field book traverse records

Sta	Dist	Bearing
1		580°E (100°) B.S. N80° (265°)
	401	
2		585°W B.S. N86°E (265°)
3	326	N 10°E B.S. S11°W (10°)
1	189	

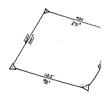
Field Sketch

Hypothetical Data Sheet

Date: November 18, 1981 Weather: Clear Crew: Joan Gonzales Peter PCV

Pedro Garcia Tools: Hand Compass & Pacing

(Fig. 38)



- In the small groups which trainees have worked during this session, they go out and practice the use of a plane table and rustic transit.
- Forester trainer checks each group's area map, calculations and traverse.

Trainer's Note: While forester trainer works with one group at a time the other groups use plane table and rustic transit. This gives everyone time to practice. This is also a time to observe bow well forester trainers are able to transfer skills, explain, controlled to the controlled training the controlled training the derivations because you will want to give forester trainees geoback during interview on their performance.

Spaniah Language

Total Time: 15 hours

Overview

Since trainees have had a very active session previous t this one, this is a good time for them to try summarizing in Spanish the activity of the morning. They may want to use newsprint and marker to illustrate points.

Procedures

Time

Activities

- Language instructor asks each traine summarize one activity of the morning session.
- Vocabulary
- 3. Grammar

Vocabulary

North pole - polo norte South pole - pole sur North - norte South - gur

East - este West - gest

Northwest - noroeste Southwest - surceste Northeast - noreaste

Southeast - sureste Compass needle - aguja de brujula Compass bearing - rumbo

Plogging, ribbon - cinta Distance measurement - medida de distancia

Compass (for drawing circles) - compas Cardinal directions - directiones cardinales Surveyor /of land) - topografo, agrimensor

gulo recto ohe

SESSION XXVIII

Forestry Extension

notal Time:

coals:

- To identify and discuss what participants have learned about extension work up to this point.
- To explore and apply these conclusions at the mid-point in training.
- j. To assess and develop strategies which will enhance the consideration and improve acceptance of extension as part of forestry.

Overview

This session will provide an opportunity for participants to consolidate their learnings and discuss and clarify their ideas reparding extension work. It will also provide an opportunity to apply some of these learnings to activities PCVs can implement in their communities and provide an overview of different ways in which extension work can be integrated in the PCVs works.

Materials: Flip chart, marker pens, tape.

Forestry Extension

Procedures

Time		

Activities

5 minutes

20 minutes

 Introduce session by briefly stating it goals and presenting an overview of the session.

Individual discussion

Ask participants to individually identify the major things they have learned regarding extension by writing down on a piece of paper the four or fit thoughts or ideas which stand out in their minds as being most important

about extension.

total group.

Trainer can briefly summarize each extension session before participants start in order to help them remember an identify their learnings.

Sub-group work

20 minutes

 Ask participants to form groups of five or six and share their most important conclusions of extension work. Ask the to look for similarities and difference and select any ideas, questions, concerns, they want to present to the

Group discussion

4. Reconvene and sek participants for important ideas, questions or concerns which they discussed in their small retices a questions, concerns, and now has some conclusions regarding extension. Are there any important thoughts you want to share with the group? Any surprised you? Were there any concerns raised in your small group discussion you want to bring to the group? Trains jots down on newprint; remarks for set statements and questions made by on statements and questions made.

Ask participants to do individually the following task:

you have learned about extension, what could ntly (strategies, actions, activities) as a xtension work. Think of the following aspect work:

participants.

- a) entering the community,
- b) getting to know the community,
- c) meeting community people and making friends,
 d) identifying community needs.
- fl entering the job,
- () establishing secondary projects.
- a) establishing secondary projects,
 b) evaluating "how are you doing" as a PCV.

This is not an exhaustive list and participants do not need saddress each of these areas. It is a quideline to help them as about the different aspects of their work and different ions they might take to consider extension projects and munities.

6. Ask participants to form groups of two
or three and discuss their individual
analysis. As they discuss, they should pay
attention to which actions or strategies
seem to address extension work more
effectively; which seem more feasible
given the culture, history and
considerations in the host country
which are more practical and easy to
the strategies or settivities to present to

sk, liscuss your strategies or actions taking into consideration their effectiveness, cultural appropriateness and foasibility. If necessary, develop new strategies out of your discussion. Select the hest strategies to present for analysis and feedback.

oup discussion

 In general session, trainer asks for examples of participants strategies. Trainers react to proposed strategies using the following guidelines:

total group and receive feedback from other participants and trainer. The subgroups task can be presented on a flip chart as tollows:

Procedures

Time

Activities

- 5 minutes
- 1. Introduce session by briefly stating in goals and presenting an overview of the session.

Individual discussion 20 minutes

- 2. Ask participants to individually identify the major things they have learned regarding extension by writing down on a piece of paper the four or fi thoughts or ideas which stand out in their minds as being most important about extension.
 - Trainer can hriefly summarize each extension session before participants start in order to help them remember a identify their learnings.

Sub-group work 15 minutes

3. Ask participants to form groups of fiw or six and share their most important conclusions of extension work. Ask the to look for similarities and difference and select any ideas, questions, concerns, they want to present to the total group. 4. Reconvene and ask participants for

Group discussion 20 minutes

- important ideas, questions or concerns which they discussed in their small groups. Example: You have identifie ideas, questions, concerns, and now he some conclusions regarding extension. Are there any important thoughts you want to share with the group? Any similarities or differences which surprised you? Were there any concern raised in your small group discussion you want to bring to the group? Train jots down on newsprint, remarks for ma group. A discussion ensues based on statements and questions made by participants.
- 5. Ask participants to do individually th following task:

a) entering the community,
 b) getting to know the community,

- c) meeting community people and making friends,
- d) identifying community needs,

f) entering the job,

- g) establishing secondary projects,
- h) evaluating "how are you doing" as a PCV.

This is not an exhaustive list and participants do not need ireas each of these areas. It is a guideline to help them about the different spects of their work and different is they might take to consider extension projects and ities.

roup analysis

6. Ask participants to form groups of two or three and discuss their individual analysis. As they discuss, they should pay attention to which actions or attategies seem to address extension work more effectively; which seem more feasible of the seem of the seem of the seem considerations in the host country; which are more practical and easy to implement. They should select the beat strategies or activities to present to total group and receive feedback from other participants and trainer. The subgroups task can be presented on a flip chart as follows:

Discuss your strategies or actions taking into consideration their effectiveness, cultural appropriateness and feasibility. If necessary, develop new strategies out of your discussion. Select the best strategies to present for analysis and feedback.

p discussion inutes

- In general session, trainor asks for examples of participants strategies. Trainers react to proposed strategies using the following guidelines:
- o most likely to succeed strategies and
- o most likely to fail strategies and why,
 o suggestions and new ideas about
- suggestions and new ideas about strategies and activities which work and do not work based on their own experience.

sure minutes Trainer summarizes session by presenting or developing with the participants a list of different ways in which extension can take place in Peace Corpe activities.

erials: Newsprint for activities #5 and 6.

Forest Mensuration

Total Time: 3% hours

Goals: o To have each trainee construct their own cruise stick and learn how to use it.

- o To instruct trainees in forest mensuration and provide a simple method for determining forest volume.
- o To look at helping skills.

Overview

In this session participants will make a Biltmore Stick learn how to use it in forest measurement. One of the trains who has taken on making a Biltmore Stick instructs other trai Trainees look at one another's helping skills and give feedba

Exercises: 1. Construction and use of a cruiser stick.

- 2. Lecture on forest mensuration.
 - 3. Groups: Helping skills.

Materials:

Flip chart, marker pens, tape
o 1 board 1 meter long X 5 cm wide X 1 or 2 :

- thick for each trainee
- o Number table o Knife to scratch graduation marks
 - o Waterproof pen to identify graduation o Conversion factors for U.S. and metric uni

SESSION YYTY

xercise I: Construction and Use of Cruiser Stick

otal Time: 2 hours

verview

In this exercise trainee instructs other trainees in the onstruction and use of cruiser stick which is an instrument that an be used as:

- a) Biltmore Stick to measure tree diameter
 b) Merritt Hypsometer to measure tree height
- D) Merritt Hypsometer to measure tree height
 c) Meter Stick to measure length

rocedures

ine

Activities

) Trains (Instan

minutes

- Trainee/Instructor has all necessary materials assembled for this exercise. He/she then gives a brief lecture on the purpose of a cruiser stick using one he/she has made for demonstration.
- Trainee/instructor now shows participants how to make their own cruiser stick and the participants do so.
- Trainee/instructor along with technical

hour

instructor takes trainees who have been divided up into small groups with a forester in each group out to a stand of trees and trainees practice using cruiser stick for measuring trees. In turn, they calculate the volumes of trees using table provided.

ainer's Note: We have included here number tables or formulae calculate graduations on cruiser stick but suggest that trainee o takes this on as a special project figure out these tables for m/herself.

have also given conversion factors for U.S. and Metric Unit arts to participants during this exercise.

Cruiser Stick:

- a. Hiltmore stick measure tree diameter,
 - h. Merritt Hypsometer measure tree height,
 - c. Meter stick measure length.

Materials:

- a. Board: 1 meter long X 5 cm wide X 1 or 2 cm thick.
- b. Number table or formulas to calculate graduations.
- c. Knite to scratch permanent graduation marks.
- d. Pen with waterproof ink to identify graduations and write needed information on stick.
- BILTMORE STICK To measure tree diameter.

A. Construction

Use hardwood board (I meter long), knife, and marker. First determine reach. Reach is the distance from crulser's we to the stick held out in front of his/her hano. Find if your reach (see to outstretched hand holding board) is most your reaches for the control of the control of the reaches of 57 to 65 cm are on the number table. Starting front he left end graduate the stick using the number table from the left end graduate the stick using the number table. The number table provides graduations for meaning Dills of contineters from the left end of the stick.

If a number table is not available for your specified reach it is possible to construct one using the following formula

$$G = D^2R/D + R$$

where:

- G = distance (cm) from zero mark (left end of stick to D-cr oraduations.
- D = diameter mark (cm) currently being placed on stick,
- R = reach in centimeters.

lime of sight to

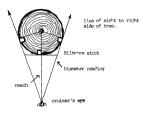


Fig. 39 - Use of the Biltmore Stick showing similar triangles.

B. USE OF THE BILTMORE STICK:

- The Biltmore stick is held against the tree with the line of sight to the left side of the tree crossing the zero end of the scale. The diameter of the tree is then read at the point where the line of sight, to the right side of the tree crosses the scale (see figure 1).
- The following precautions must be observed to obtain accurate readings with the Biltmore Stick:
 - a. The stick must be held against a tree.
 b. The stick must be perpendiculr (at right angles) to
 - the trunk of the tree.

 c. The stick must be perpendicular to the imaginary
 - line between the observer and the tree.
 d. The cruiser's head must not be moved during the
 - measuring operation.

 e. The stick is calibrated for a specified reach. This means that the cruiser's eye must be exactly the specified distance from the stick.
- MERRITT HYPSOMETER To measure tree height.

CONSTRUCTION

The Merritt Hypsometer scale for measuring tree height in meters is placed on the back side of the cruiser stick. This scale is calibrated for the same reach as the Biltmore Stick on the other side.

The merritt is ossigned for use at a particular distable from the tree (30 meters for graduations on number cle This base distance of 30 meters should be printed on 8 calls. Graduations be graduated as a call of graduations be graduated by the state of the contract of

If a number table is not available for your specified; it is possible to construct one using the following in

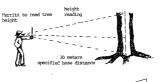
Where:

L = length (cm) to be marked off on stick for each meters of tree height,

H = tree height in meters,

B = base distance in meters,

R = reach in centimeters.



н

. 40)

USE OF MERRITT HYPSOMETER:

- 1. The cruiser stands at a specified distance (30m) from the tree, with the hypomoneter scale held vertically at arms' length. The bottom end of the scale is moved upward or downward until it is on the line of sight to the contract of the contract of the contract of the read at the point where the line of sight to the upper linit of the stem intersects the scale (see figure 2).
- The following precautions must be observed to obtain accurate readings with the Merritt Hypsometer:
 - a. The stick is designed for use at a particular hase distance (horizontal distance) from a tree. This distance should be printed on the scale.
 - b. The stick is calibrated for a specified reach. This should be the same specified reach as for the Biltmore on the other side.
 - c. Failure to hold the stick vertically will cause inaccurate readings.

METER STICK - To measure length.

The stick for the Biltmore and Merritt should be 1 moter one. On the side one can add a centimeter scale. This will provide the cruiser with a handy measuring stick.

(n) THEE	on from bo	ttom of stick
Holght Mark	57 on reach	65 on reach
1	1.90	2.17
2	3,80	4,33
3	5.70	6,50
4	7.60	8,67
5	9.50	10.83
6	11,40	13.00
7	13,30	15,17
8	15.20	17,33
9.	17.10	19.50
10	19.00	21.67
11	20,90	23.83
12	22.80	26,00
13	24.70	28.17
14	26.60	30,33
15	28.50	32,50
16	30.40	34,67
17	32.30	36.83
18	34.20	39.00
19	36.10	41.17
20	38,00	45,33
21	39.90	45,50
22	41.80	47.67
23	43,70	49.83
24	45.60	52.00
25	47.50	54.17
26	49.40	56.33
27	51.30	58.50
28	53,20	60,67
29	55.10	62.83
30	57.00	65.00
31 32	58,90	67.17
33	60,80	69.33
34	62.70	71.50
35	64.60	73,67
	66.50	75.83
36 37	68.40	78.00
38	70.50	80.17
38 39	72,20	82.33
40	74.10	84,50
	76.00	86.67

DBH		t end of stick	DBH	on from left	
Mark	57 on reach	65 on reach	Mark	57 cm reach	65 cm resc
(cn)			(cm)		
1	0.99	0.99	101	60,66	63.20
3	2,92	2.93	103	61,48	64.07
5	4.79	4.82	105	62.28	64.93
7	6,61	6.65	107	63.08	65.78
9	8.36	8.43	109	63.87	66.62
11	10.07	10,17	111	64,66	67.46
13	11.73	11.87	113	65.43	68.28
15	13.25	13.52	115	66.20	69.11
17	15.13	15,14	117	66.97	69.92
19	16.45	16.71	119	67,72	70.73
21	17.95	18,26	121	68.47	71.53
23	19,41	19.77	123	69,22	72,32
25	20.84	21.25	125	69.95	73.11
27	22,24	22,69	127	70,69	73,89
29	23,61	24.12	129	71.41	74,67
31	24.95	25.51	131	72.13	75.44
33	26,26	26.86	133	72.85	76,20
35	27.55	28.22	135	73,56	76.96
37	28.81	29.54	137	74.26	77.71
39	30,05	30,63	139	74.96	78,46
41	31.27	32.11	141	75.65	79.20
43	52,46	33,36	143	76.34	79.94
45	33,64	34.59	145	77.02	80,67
47	34.80	35.61	147	77.70	81.40
49	35,93	37.00	149	78.38	62,12
51	37.05	38.18	151	79.05	82.83
53	38.15	39.34	153	79.71	83,54
55	39.24	40.48			
57	40,31	41.61			
59	41.36	42.72			
61	42,40	43.81			
63	43,42	44.89			
65	44.43	45.96			
67	45.43	47.02			
69	46,41	48.06			
71	47.38	49.08			
73	48.34	50,10			
75	49,28	51,10			
77	50.22	52,10			
79	51.14	53,08			
81	52.06	54.05			
83	52,96	55.01			
85	53.85	55,95			
87	34,74	56.89			
69	55.61	57.62			
91	56.47	58.74			
93	57.33	59,65			
95	56.18	60.55			
97	59.01	61.44			
99	59.84	62,33			

Conversion Factors for U.S. and Metric Units

col into c	convert lutin 1 column 2, tiply by	Column 1	Column 2	column 2 into column multiply he
	-	Lengt		
	621	kilometer, km	mile, mi	1,609
	094	meter, m	yard, yd	0.914
0,3	394	centimeter, cm	inch, in	3.54
		Area		
	886	kliometer, km²	mile ² , mi ²	2.590
	7.1	kilometer, km²	acre, acre	0.00405
2.4	171	hectare, ha	acre, acre	0.405
		Volum		
	0973	moter ³ , m ³	acre-inch	102.8
3.5 2.8	134	hectoliter, hl	cubic foot, ft ³	0.2832
	284	hectoliter, hi	bushel, bu	0.352
1.0		liter	bushel, bu	35.24
1.00	01	HEET	quart (liquid), qt	0.946
		Mass		
1.1		ton (metric)	ton (U.S.)	0.9072
		quintal, q	hundredweight, Swt (short)	0.454
2.2		kilogram, kg	pound, lb	0.454
0.0	35	gram, g	ounce (avdp), oz	28.35
		Pressur	٠.	
14.		bar	lb/inch2, psi	0.06895
	9869	bar	atmosphere, atm	1,013
14.	9678	kg(weight)/cm2	atmosphere, atm	1.033
14	70	kg(weight)/cm2	lb/inch2, psi	0.07031
		almosphere, atm	lb/inch ² , psi	0.06805
0.4	40	Yield or B		
0.4		ton (metric)/hectare	ton (U.S.)/acre	2.240
0.8		kg/ha	lb/acre	1.12
		quintal/hectare	hundredweight/acre	1.12
		Temperat	ire.	
13	(C) + 32		Fahrenheit	•
1 3	1 - 1 - 32	-17.8C	0F	3 (sb.
		0C	32F	,
		20C	68F	
		100C	212F	
8.108	h	Water Measu	tement	
7,29	hectare-mete fectare-mete	rs. ha-m	acre-feet	0.1233
0.08108	heclare-centi	neters, havem	acre-inches	0.01028
0.973	hectare-centi	meters, ha-em	acre-feet	12.33
0.00973	melers) m3		acre-inches	1.028
0.981	hectare-centi	meters/hour, ha-em/hour	acre-inches fect ³ /sec	102.8
0.3 0.00981			U.S. gallons/min	1.0194
				0.00227
4,403	meters ² /hour		feet3/sec	101.94

SESSION XXXX

Exercise II: Porest Mensuration Lecture

Total time: 1 hour

Overview

The purpose of this lecture is to aquaint the trainees with forest mensuration and provide a simple method for determining forest volume.

Procedures

Time

Activities

 Technical trainer gives following lecture posting lecture outline on newsprint.

OBJECTIVES: To acquaint the trainees with forest mensuration and provide a simple method for determining forest volume.

Trainer explains how volume is determined and diagrams instructions.



(Fig. 4;

Draw in how many boards can be produced out of each log depending on diameter of small end of log.

VOLUME = end area in board feed/ $_{12}$

V = Area small end/12 X Length $V = .06545(D^2)(Length)$

Less Slab - Deduct 2" - 4" from Diameter (Variable X) V = 06545(D - X)length

Less kerf = K/K+T

Explanation of what is saw keft

A=% of volume deduced for saw kerf K = Thickness of saw kerf

T = Thickness of board

 $V = (1-A) \cdot u6545(P-K)^2 f$

Standard Volume Table

Sample trees

Altura (height) DAP (DBH)

Trees felled and bucked into logs "DAP" and "altura" taken



- Calculation of volumes made by log and totaled for each tr
- Volumes of trees in same DAP and altura class averaged and out in tabular form

DAP Altura

	10	15	20	25	30
14	0.081	0.103	0.126		
16	0.098	0.128	0.159		

Forest Area

Important: Determine area of forest



If it is done first or last: You have to know area of forest to compute the total volume.

Forest stand area for purposes of example calculated to be 6.5 hectares.

Planning the Field Work

Planificación de trabajo de terreno)

- o Delineate Forest Types
 - o Make types as homogenous as possible

planted '52 30% stocked

Planted planted

planted '55 100%

70% stocked :

70% stocked

2 monocultures (native)

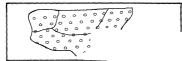
Major species X, Y and Z 70% stocked Major Species A,B and C 30% stocked

Major species A,B and C 70% stocked

Plot Layout

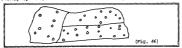
(Sistema de Uhicación de parcelas)

-Systematic



Plots layed out at set distance from one another along a straight line; lines evenly spaced, and should cross drainages

-Random



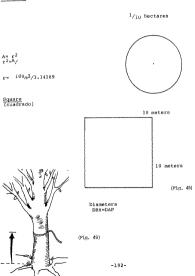
Plots located randomly - no pattern
1. Lay out on graph paper with X & Y coordinates; pick

random numbers for X and Y coordinates to plot.

2. Throw beans or rice over map of area.

Plots (Parcelas)

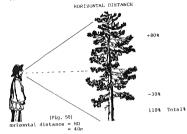
Circular



(Fig.

Heights

put "shooting" tree heights all measurements are.....



Free Height = HD X % = 40 X 1.10 = 44 meters

Fi				

Species	Plot	DAP	ALTURA	DEFECT	Notes Volume*	
	1	14	42	-0-		
		18	46	10%		
		26	69	-0-		
	2	22	61	-0-		
		28	75	10%		
		32	79	~0~		
		18 26 22 28	46 69 61 75	10% -0- -0- 10%		

*Add Volume using table described below.

Determining Volume of a Tree (Determinación de Volumen de un arb



Total Volume Cruised by Forest Type

t No.	Total volume for each plot
1 2 3 4 5	8.172m ³ 12.101 15.111 11.002 10.301
6 Total Cruise Vo	9.221 olume 65.908m ³

Total Volume of Stand

tal cruise volume = 65.908m³
tal no. of plots = 6

 $.908m^3/_6$ = 10.985m³/Plot (Average)

size of plot = 1/10 ha

.983m3/plot x 10 Plots/ha = 109.85m3/hectare

ea Estimation = 6.5 has $9.85m^3/u_0$ x 6.5Has = $714.025m^3$

 $9.85m^3/_{\text{Ha}} \times 6.5$ Has = $714.025m^3$ = Total Volume of Stand

SESSION XXIX

Exercise III

Group Helping Skills

Total Time: 1 hour

Overview

Luring this session, it has been necessary for generalist trainees to lean on forester trainees for help in understanding and using a cruiser stick. The generalist trainees will need further help understanding the intricacies of forest mensuration. The trainees will give feedback to forester trainees and vice versa.

Procedures

Time

Activities

 Technical trainer asks groups formed earlier to use cruiser sticks to regroup. Technical trainer asks menuration with generalist trainers and to answer questions they may have about forest menuration and clear up any misunderstandings. Technical trainer and the standard of the standard of the called on as a resource person.

hour

Groups are now asked to give each other feedback on skills transference during session: The following guidelines are posted on newsprint.

Forester Trainee:

- 2.1 Ask for feedback from others on your ability to help them.
 - o What did it feel like to be a giver of help and what can we learn from

15 minutes

- o What may be different about helping others in host country?
 - How might cultural variables affect a helping relationship?

. Generalist Trainees:

o How can I approach others for help (Re it PCVs or HCNs)?

- o How was I perceived as a helpee during this session?
- o What did it feel like to be helped and what can I learn from this?
- Putting myself in a HCN's shoes, what might it feel like to get technical help?

2.3 All Trainees

- o how can we apply the helping relationship to extension work in forestry?
- o What things have we learned in this exercise that might help or hinder us as extension workers?
 - 2.4 Trainer asks groups for their findings on things that help/ hinder and writes them on newsprint. Porester trainer now summarizes the learnings about helping relationships.

minutes

iinutes

Spanish Language

Total Time: 15 hours

Overview

During this session trainess will review the different instruments they have made up; diameter tape and cruiser stick and try to form sentences describing how those instruments are used. More advanced students will propare charlas describing use of instruments. Vocabulary is reviewed for pronunciation and sentence construction.

Procedures

Time

Activities

 Review in Spanish of instruments that have been made. Includes forming of sentences to describe their use.

- 2. Vocabulary review.
- 3. Sentence construction.

Language Instructor's Note: You may want to start giving simple assignments for future classes at this point. Remember that trainees have other assignments they are working on. Assignment time should not exceed a hour outside class at this fine.

Vocabulary

Surveying - agrimenture

Monoculture - monocultura Contour - contorno curva de nivel Contour planting - siembra a nivel Contour map - plano topografico Level - nivel Terrace - terraza Teeth - diente Terminal bud - baton terminal; yema terminal Path - sendero, senda, pique Ox - buev Landslide - derrumbe To freeze - congelar, helar Frost - escarcha, helada Broadcast seeding - siembra al voleo To dig - cavar; excavar Slope - pendiente To destroy - destruir, destrozar Bare roots - raices desnoda Horizon, laver - cana

Measuring tape - huincha para medir

Azimuth - azimut Sand - arena Sandy - arenoso



SESSION VVVI

Working with Groups as an Extension Worker

Total Time: 1 hour 45 minutes

Overview

This session continues to focus on extension work. Working with groups is stressed as a way of doing extension work.

Procedures

FECCEDATE

Activities

Time 30 minutes

 Trainer gives lecture on why it is best to ty to do extension work with groups of people, rather than individuals. Trainer goes into group dynamics and stresses risk taking, (Samule lecture follows)

Trainer's Note: Lecture should be in your own words, use situations with which you are familiar to stress points.

Sample Lecture

AWARENESS

INTEREST

> BVALUATION

A propensity to take risk supported by rational decision making processes in the evaluation stage, or promoted through behavioral techniques utilized by extension agents

TRIAL

ADAPTATION

SESSION XXXI

Why Organize Groups

Both subsistence farmers ann large land holders, are less disposed to take risk on an individual basis. The behavioral tool however, or the risk-shift phenomenon largely used in a business-making atmosphere, can be used more effectively to promote risk taking by small groups of people involved in collective decision making.

Small groups of people concerned with decisions that involve some element of tisk, unlike large group members will, after engaging in various modes of group discussion, make a collective decision that is far more tisky than their individual decision on the same matter would be. Key elements here is that group discussion on a matter of importance must take place to the point of group <u>Consensus</u> on that particular matter before the shift Occurs.

In the case of subsistence farmers, much depends upon the extension agent's ability to explain the risk involved to group members, and consequently show how the new technology substantially exceeds, in cost/benefit advantages, the farmer's present traditional technology.

For example, if an extension syent suggests to a group of farmers that a particular technology or agricultural technique could improve productivity, but is unable to explain how much the technology would cost, where it could be obtained, how to use it and what benefits could be expected from its use, one can rightly feed to the could be expected from its use, one can rightly feed (aim will not be taken to adout the technology.

There are four major hypotheses that support the process of group acceptance of risky technical innovations. These four are the leadership, familiarization, diffusion-of-responsibility and risk-ma-value hypothesis. In order for risk-milt to occur, regardless of the particular hypothesis, a group discussion to the for without discussion and consensus the shift will not occur.

In the leadership hypothesis, it is believed that certain group members are viewed as both natural risk takers and group leaders who have an showe average influence on the rest of the group membership. The it is claimed to be more dominant and/or influential in the group discussions and consequently influence the group in the direction of accepting risk. However, a behavioral problem with the leadership approach is that leaders certain circumstances. This brings us back to the extension agent's ability to explain accquately the nature of the risk involved: An effective group leader can play a very conservative role in the perceives that the extension agent is the perceives that the extension agent of the proceives that the extension agent does not know what lavolved. Once convinced that a suggested program is adequately

organized and supported, leaders become effective promoters.

Current thought on the role of opinion leaders in village societies is that extension agents should be made aware of the potential effect, negative and/or positive, leaders can have on the transference of new technology to group members.

remiliarization: Group discussion allows persons to become nore intelligration the issue being discussed and consequently increase familiarity with the issue. As a result of becoming fomiliar with tober group members' attributes toward the risk, rembers will be members attributes toward the risk, rembers will be members stand on the particular Lanue. (Ropers: "There eppears to a pooling effect in media forums (groups) by which the members who hegin at lower levels of knowledge, persuasion, or adoption gain more in these respects than do forum group embers

A group of peasant farmers (who have attained at least the minimum capacity to function together as a cohesive desicion-mail unit) in deciding whether or not to take the risk to adopt a member to the control of the country and becoming familiar with its establed objective - to improve

Diffusion of Mesponsibility: It is felt that group discussion and Cohesion develope emotional bonds between members and frees the individual from full responsibility for his tieky decision. An individual teels that his decision has been shaped by the group and if it falls, he is no worse off than the others since they will fail together. It is difficult for subsistence farmers particularly in the Latin American countries to establish strong emotional bonds with each other, even in many cases, when they are related. In Latin America there appears to be a great strong emotional first and there groups will probably not developed.

This hypothesis cannot account for cautious shifts. The hypothesis does not specify how the creation of emotional bonds among subjects makes them less concerned about the negative consequences of risky decisions.

Most damaging of all appears to be the exchange of relevent information, not the development of emotional bonds that is necessary for the risk-shift to occur.

Risk as Cultural Value: This hypothesis maintains that moderate risk has a cultural-value which develops during the life span of

Let's go back to familiarization and talk about that grocess, information exchange, teedback and group discussion.

Variables to Risk Taking

Not Known or Understood

Not Within Farmer's Managerial Competence

Parmors may have heard but the comprehension of what it can do or the effective utilization of the new technology may require additional knowledge and skills which they are now lacking.

Not Socially, Culturally or Psychologically Acceptable

A great deal is made in the development literature of those asses where a new practice or a new technique has not been adapted accause it would upset too severely the established patterns of social or economic political organization.

Not Technically Viable or Adequately Adapted

Very often the new recommended technology has not in fact sen locally adapted or tested under conditions which more closely pproximate those taced by the tarmer. Subsistence farmers are intend and can discern whether the new variety or practice has had nough adaptive research and local testing to meet their unique coal needs.

Not Economically Feasible

Probably the biggest single cause of resistance to change is he unprofitability of the new technology as seen by the farmer. ften the new technology requires the purchase of additional puputs to achieve the higher productivity and these inputs have a sat. Further, when the farmer compares the expected output plus alonge sheet employing the new technology is found warking.

Not Available

Often the new technology is embedded in a physical item such as seeds, pesticides, fertilizer or equipment. Unless the new tem is readily available to the farmer in quantities at the time eneeds it, knewledge of its potential contribution to his grigultural production will not result in its adaptation.

2. Divide into small groups and give each group a different problem (see examples) to search their own experience tor specific examples of situations in which they encountered a similar problem and what solutions were used in that group situation. Would it work here in host country?

- Groups give presentations to large group on problems they had, experiences that were similar, and possible solutions;
- Problems ensure that effort is maintained when extensionist is drawn.
- To get outside organizations (including local governments, voluntary organizations and technical departments) to cooperate in forestry extension work.
- o To get local leaders to cooperate.
- To work in a community divided by racial or religious factions or by other factional rivalries.
- To regain the confidence of a community once it has been lost.

5 minutes

- Trainer draws learnings from presentations that would apply to extension work. Asks for generalizations about groups from participants.
- Trainer now does summary of the three sessions on extension work. Conclude with the following:
- Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The relative advantage of a new idea, as perceived by members of a social system, is positively related to its rate of adoption.
- Compatibility is the degree to which an innovation is percolved as consistent with the existing values, past experience, and needs of the receivers. The compatibility of a new idea, as percolved by sembers of a social system, is positively related to its rate of adoption.
- Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. The complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption.
- 4. Trialability is the degree to which an innovation may be experimented with on a limited basis. The trialability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption.
- Observability is the degree to which the results of an innovation are visible to others. The observability of

an innovation, as perceived by members of a social system, is positively related to its rate of adoption.

(Communication of Innovation by Rogers & Shoemaker)

After studying more than 1500 publications on the diffusion of ideas and the change process, Rogers and Shoemaker found that extensionists were more successful when they:

- Expand more effort in change activities with communities;
- Are community oriented rather than change agency oriented;
- Propose programs compatible with community needs;
 Have empathy with their communities and community members;
- 5. Are similar to their community members;
- Work through opinion leaders;
 Have credibility in the eyes of their community;
- 8. Increase their community's ability to evaluate innovations.

Reference:

"Training for the Cross-cutural Mind," The Society for International Education, Training and Research, Washington, D.C., 1980.

Everett Royers and Floyd Shoemaker, Communication of Innovations: A Cross-Cultural Approach,"
"New York Free Press, 1971.

Allen D. Jedicka Praeger Publications 200 Park Avenue New York, New York 10017 Oruanization for Rural Development, 1977

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SESSION XXXII

Agro-Forestry

Total Time: 4 hours

Goalsı

- o To introduce agro-forestry as a possible marriage,
 - To explore the concept of forestry in combination with agriculture or livestock.
 - o To explore the agro-forestry as a good concept.
 - To explore agro-forestry as an extension technique,
 - To look at elements necessary in planning an agro-forestry project.

Overview

Agro-torestry as a sub-discipline of forestry is a concept recognized in the last ten years but it should be pointed out that farmers have been practicing agro-forestry for hundreds of years. As a new discipline, there is not yet a great deal written about being researched and investigated throughout the world. In this session we explore the concepts of agro-forestry and look at agro-forestry in extension work. Each participant's agro-torestry plan is evaluated and questions snawered, it should be pointed the plants of the pointed plants of the property of the propert

Trainer's Note: Agro-forestry plans written by trainees are submitted the day before, to give trainers a chance to review them before presentation.

Exercise: I. Lecture on Agro-Forestry
II. Rosponse to individual agro-forestry plans by
trainees.

Materials: flip charts, marker pens, tape, article "Can Farming and Forestry Coexist in the Tropics?" (Optional).

Trainer's Moter During the pilot of this training program, we were able to get a researcher in and practitioner of agro-foresty in the manonises of the program of the program of the same of the same of the technical trainers has a great deal of experience in this field. Since practioners are hard to come by, we have tried to make this outline as comprehensive as possible. A lecture by an expert is included in this section.



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Can farming and forestr coexist in the tropics?

John S. Spears

During recent years environmental agencies, particularly in the United States have done a valuable job in drawing public attention to the rate of tropical forest destruction and mobilizing awareness of the need for more effective forest protection policies. During this century the area of tropical forest of the world has declined by more than a half. FAO's latest estimates expect a further 10 to 15 percent decline by the end of the century. and it is possible that, unless something is done to reverse the present trend by the middle of the next century, the bulk of the tropical forest ecosystem as we know it could disappear. Botanists, ecologists and enviroumentalists have pointed out the irreversible loss to mankind which would result, citing, in particular, the loss of genetic material and the potential contribution to human welfare of drugs and medicines available from tropical woody plants. Many international conferences have been held to help create better political awarenest of these issues

However, a deliberate shift in the emphasis of conservation and development strategy is needed. If we are to ensure preservation of a significant

Five World Bank projects are examined from the point of view of how they answer human needs for the kind of sustainable forestry and farming that are barmonious with tropical forest ecosystems. How can forestry benefit people as well as conserve increasingly endangered forests?

These studies are taken from Malaysia, Colombia, Kenya, Indonesia and the Philippines.

part of the world's remain'u forest ecosystem, we sho more on how to improve the and quality of life of the 20 subsistence farmers living is: shifting cultivation in tree areas. Only the briefest the history of agricultural set Europe. North America where is needed to suspent policy aimed at halting th process of forest destroycompletely excluding profe tropical forest areas is to succeed. Attacking the root forest destruction -- runt r forest areas - and newid farmers with a viable alter shifting cultivation are the An essential first step was recognition that a large of "forest destruction" taking tropical developing countri has generated such an enc sponse from agencies in pred temperate-zone developed to

in fact, a logical shift in la more productive agriculture. What can be done in pract to make it possible for sna to abandon forest cutting at cultivation, to adopt sustain ing systems and to become more stable rural community are the most appropriate d techniques?

A few examples of proje ences, some successful and so, financed partly by the W may help in the search for

JOHN S. SPEARS IS Forestry Advisor to the World Bank, Washington, D.C. This article is a personal contribution and the views expressed do not necessarily represent an for reducing the risk of continued

In reviewing these project experimes, I have set up three criteria: What impact have these projects made on mral incomes? In particular, have

emmunities and in arresting shifting ultivation? Was adequate provision made in project design for protection of part of

the forest area or for establishment of compensatory forest plantations, and

compensatory forest plantations, and has this happened in practice? Are the cropping patterns being developed likely to be sustainable in the light of what we know about the soil

structure and capability in the forest areas being settled?

Two agricultural land-settlement projects, both of which involved forest agricultural tree cropping and in the second, livestock development, are examined below.

Malaysia: the Jengka Triangle Land Settlement Project

The Jengka Triangle in the state of Pahang covers about 120 000 ha, of which about half are considered suit-



ROAD BUILDING IN COLOMBIA plenty of problems

able for agricultural development. The rare was identified in the early skirties as favourable for large-scale tree-crop development and settlement. While caulier land settlement owk place in smaller schemes seattered throughout Malaysis and close to existing infrastructure, the Jengka Triangle was to be the largest attempt at that date for the development of virgin tropical forest lands.

In 1965, a technical assistance grant was made by the World Bank to the Government of Malaysia to help finance a land-use study of the area and the preparation of a regional development plan. 'The "master plan" completed in 1967 called for comprebensive development of the Triangle. comprising settlement, in a first phase, of some 9 000 farm families cultivating about 40 000 ha of oil palm and rubher: systematic exploitation of forest resources prior to settlement: urban development, including the establishment of three new townshins; and extensive infrastructure development,

A first Jeneka Triangle Project. commencing in 1968, planted 12000 ha of oil palm and 1600 ha of rubber. A second project, commencing in 1970, developed a further 7000 ha of oil palm and 6000 ha of rubber. Physical works included clearing of forest land, construction of houses, offices and stores to accommodate settler families, and recruitment of management and support staff. A palm-oil mill was constructed together with appropriate roads, water systems, and educational, health and other social services. About 300 ha were developed for crop diversification trials on a commercial scale. Each settlement comprised about 4 ha of planted oil palm or rubber, and a house lot of 0.1 ha for growing food crops. A third loan, made in 1973, will complete the programme.

According to the three criteria defined earlier, the project can be judged successful. Rural incomes of 1900 families extited in the first phase 9 2000 families extited in the first phase have shown a four-fold increase. Settler tumover rates are low (two percent) and the village communities are expected to remain stable. By eareful forward planning and the carrying out of appropriate land-use and aviil-cannbilly survey price to astiencent about 80 000 h to ffeets comprising to the control of the contr

it seems reasonably certain that the cropping patterns developed in Jengka, based on perennial tree crops, are sustainable, given appropriate fertilizer application. The economic rates of return have been higher than expected, and Malaysia's exports of palm oil have been a very significant source of foreign exchange earnings.

foreign exchange earnings On the negative side, there were several problems. Settling families had difficulty in protecting their crops from wild pig and other animals because of the close inter-relationship of forests and settled lands: attempts to increase revenues from salvage logging in the area prior to settlement. by establishing a sawmill and plywood mill, have not been very successful. Finally, controversy arose over the relatively high cost of the project (US\$15 000 per settled family) and the extent to which this type of project is replicable. Lower cost criteria have now been introduced for future World Bank involvement in settlement

projects.

To maintain at least part of the remaining tropical forest cosystem intact, the Malaysian Government in
1976 created an Environmenta Mistry and prepared a comprehensive
environmental plan for the country,
aiming at setting aside more than
1 million ha of forest as permanent
bottle reserves and national parts.
Of this, 0.5 million ha have already
been reserved.

been reserved.

As a model for replication in other countries, the intensive land-use and soil-capability surveys carried out prior to the Malaysia Jengka project are particularly noteworthy. The perennial agricultural tree cropp being grown provide an effective still protection and catchment area cover, and the prospect of sustainable income for the farmers. Such necessial sericul-

tural tree crops already.

25 million ha of the systeopical forest lands; not for most of these crops further expansion of servorder of an additional 2ct be expected between near of the continue.

Colombia: Caqueta S Profect

In this project, land sc. spontaneous, less forms's successful than in Jenki based mainly on a like's system.

Colonization of the ag ureas of Colonado statable during the rubber boom, of century. In the late thirds, bers of settlers began to p word apread that they col's session of public land at area was very well saided; Government support star'd with a directed seathenest ganized by Caja Agraria, it because of poor selection, and inadequate supersit's

In 1969, the Government bia requested World Banke development of a centistal settlement programme. A US\$8 million was made in: first-phase Cappus Project to be developed over three administered by a new sette cy, INCORA. It was to ! 8 000 settler families living The first phase provided less stock loans for 4500 sessen tion of 380 km of roads, 8 schools, six health centra provement of INCORA's a tion. Settlement costs were

at US\$20 million.

In practice, the project of a number of problems incosiderable price increase is unexpectedly difficult byditions affecting, in partiroad construction properlack of participation by a
constructing sobotis used
programment. Toward our.

dishursement, the project design was changed and, in 1975, a second loan was made taking into account difficulties encountered under Phase I. It ass concluded when defining the secced phase that, while it was premature to observe any improvement of benefciaries' incomes, the possession of a basic livestock herd had enabled parfernants to maintain themselves on their current holdings (averaging 85 ha) instead of continued dependence on shifting cultivation. By importing 60 percent of the breeding cattle into Cagoesa, the project had "markedly imrecoved the development prospects of an area designed to play a major role in Government's efforts to develop

in Government's efforts to develop inestock production". Outstanding problems, such as in lack of technical assistance to farmers, inadequacy of road maintenance, and the provision of social services were to be rectified in the second project phase. The Caqueta project has been controversial. Kirby, for example, has commented in Pacific Viewpotnt:

"Not only are most farmers operat-

ing a form unit smaller than that reearded as viable in a beef breeding/ fattening economy, but that the tendency toward a himodal structure is accentuated by the inability of small farmers to buy cattle. Credit is availshie for the purchase of foundation stock, and, with an inflation rate of more than 20 percent, credit bears a negative rate of interest of 12 percent per annum after a three-year grace period. But new colonists are very wary about credit for cattle purchase. for, if animals die, or are rustled, the lean must still be repaid. Credits for had clearance or pasture are rarely sought since the value of the improved and will be directly dependent on grazing animals not necessarily available to offset its cost. In addition, the Caia de Crédito Agrario has an understandable (endency to lend money to established farmers, where supervision is easier and repayment guaranteed by the collateral security of an eristing herd. In summary, the situation in Amazonia is one of very slow improvement in the lives of the new settlers. In 1971, only 55 percent of Medina's sample, in Caqueta and Putumayo, would have stayed on their

farm if the possibility existed of their moving elsewhere. For the majority, life is one of shifting cultivation of subsistence crops, living on informal

shopkeeper credit."

It would be premature to draw any firm conclusions about the project's possible long term impact on rural incomes. But this project does highlight the major issue concerning planned

The World Bank's new forestry lending policy stresses watersheds, energy reforestation and smallholder cash-crop tree farming.

settlement in the Latin American tropical forest regions - that of the extremely poor quality of some of the forest soils and the difficulties of ensuring sustained livestock and crop production. Much publicity has been given to the degradation of former tropical forest lands in Brazil, caused, for example, by hadly managed livestock schemes. By contrast, Sanchez has presented a body of evidence from trials carried out by the Centro Internacional de Agricultura Tropical, Cali, Colombia (CIAT),2 and other agencies that, given appropriate fertilizer treatment, stocking density and agronomic management, a considerable proportion of the acid latosols of the Amazon region is capable of sustained agricultural crop or livestock production. Several fairly large-scale pilot programmes are under way, the results of which could be highly significant for future development in the Amazon region.

Regarding the extent of adequate provision for protecting the forest resources in this settled area, the Caqueta Project experience was an acknowledged failure. At the outset of the project, a deliberate attempt was made to set aside an area of 20 000 ha as a permanent forest reserve, but within a year, despite expenditure on forest guards' housing and protection services, the area was

invaded by colonizing families To ensure an adequate supply of fuel, building poles and timber for incoming settlers and to maintain the protective role of the forests, the Caqueta Project area which was originally part of an officially declared "Amazon Forest Reserve" was made the target of special resolutions 3 aimed at ensuring that colonization should take into account the need to preserve the forests. The law required recipients of more than 50 ha of public lands to keep 20 percent under forest and it allowed the Government to maintain 10 percent of the area as a protective zone. In practice the farmers' obligation under this law proved impossible to enforce; the experience on fully developed farms showed that, on average, settlers would maintain not more than five percent of their land under forest for the protection of a spring, or for the supply of housing and fencing wood.

This experience suggests the need for greater flexibility in defining forest laws which decree that an arbitrary percentage of settlement areas should be retained as forest cover, a common feature of land-settlement projects. The Caqueta farmurs' decision to protect only five percent of the forest land in order to ensure basic needs for fuelwood and other forest products would seem quite rational in the light of experience elsewhere, which suggests that an average rural family might need something between 250 and 500 trees (less than 0.5 ha) to maintain basic domestic needs. The relevant point is that the main bencficiaries of the various government resolutions aimed at protecting a larger area than this would be farmers situated downstream from the Caqueta Project area, who would benefit from protection of the river head-waters, reduced flooding and sedimentation. These "external" benefits have little relevance to farmers living within the Caqueta Project area, and it is hardly surprising that they should regard the 20 percent restriction primarily as an obstacte standing between them and the possibility of increasing family income by developing additional food cropping areas or acquiring more livestock.

The broader issue raised here is whether, in fact, retention of, say, 20 percent forest cover is the only way to ensure effective catchment area protection. While there is plenty of seientific evidence to show that undisturbed natural forests provide an ontimum cover for ensuring adequate soil protection and regulating down. stream flow there is also evidence from many parts of the world, including tropical areas, that other forestry, spriculture and livestock farming systems can also provide adequate catchment protection (see Kenya project below) provided care is taken over soil conservation measures, and livestock numbers are maintained in balance with the carrying canacity of the land. Seen in this light, an alternative approach to designing the Caqueta Project might have placed oreater emphasis on soil conservation measures and on the back-up extension services nceded to ensure adequate husbandry practices. For protecting forests on very steep slopes and along river hanks in the project area, greater flexibility in selecting areas for protection and closer consultation with incoming settlers on this aspect might have produced different results. Recently, the project's forestry component has been revised along these lines and progress is being manitored to assess the impact of these changes in project design.

A second major issue which arous during the formulation of the Cagusta Project, and which has considerable retearance to settlement schemes in other gents of the tropics, was the contract of the contract of

cubic metres of mature timber were rebeing cleared, only one percent of of which was sawn and sold, and the rest to burned. Of total stateding biomass sold volume of something between 250 and only 50 cubic 300 cubic metres per ha, only 25 trees averaging 40 cm diameter or more were suitable for processing into lumber or plywood — and of that, only 17 cubic maters were of society which to

were marketable. Although to 30 cubic metres (40 percent) verable for chareout) barning sat wood production, they could a used for this purpose because he call and meanest potential caper, kets were saturated. After be study of this issue, if was con-

"It is considered quite impagi if not impossible, to rationally 2



wite present stage of development of Cometa Project Whatever benecould be obtained from a ratioand forest exploitation should be aded against the delays it would let in developing the area through extreeous colonization. The studies ed out show that, under these witions, rationalized forest exploitasould not be economie".

Kenya: the taungya system

Kenya's plantation forestry programme has a number of features of general interest including the role which plantations could play in reducing pressure on the natural forest ecosystem: the provision for the setting aside of specified nature reserves: the fact that some of the past shift in

land use from forestry to agriculture was based on systematic long term catchment area studies of the likely impact of different cropping natterns on stream flow and downstream agriculture

Kenya's forests cover about 2.5 mil. lion ha (about four percent) of the country's total area (16 percent of the land area receiving more than 850 mm of rainfall). Over the nast 50 years the indiseasons forest has been continuously exploited for the production of sawntimber and other forest products. Because natural resenention of indigenous forest species takes between 60 and 100 years to produce timber of asable size the Government over the last 30 years, has been replacing some of these forests with faster growing exotic softwood plantations. To date. a total of about 160,000 ha of industrial plantations have been established. representing seven percent of the total forest ores

In 1969, the World Bank made a loan of US\$2.6 million to finance part of the costs of a six-year time-slice of this plantation development programme. The aim was to establish 28 000 ha of plantations during this period and it was successful in meeting the target. In 1976, a second loar of US\$10 million financed the continuation and expansion to cover the whole of the industrial plantation programme of the Forestry Department This project is due for completion in 1980 and a third phase will simples. neously, concern rural afforestation and industrial capacity needs for processing the expanding raw material

Most of Kenya's afforestation programme has been carried out using the "taungya" system. In Kenya, forestry workers grow mainly maize, beans or potatoes for a period of four or five years, after which the plantation is grown on as a monoculture forestry crop until ready for harvesting. Pines and Mexican everess were the mair species used.

With respect to the three main criteria used in this paper the project can be regarded as successful. The forestry plantation programme provides sustained employment for some 5 000 nersons. Kenya's forest villages



more than 100 of which have been established over the last 30 years, sustain stable forest communities dependent on a combination of agriculture and forestry work for their livelihood. Many of the forestry workers are second-generation forest villagers. As the forestry programme has proceeded, secondary employment apportunities have been generated in logging, sawmilling, pulp and paper

and furniture factories. The new forestry plantations have a wood productivity some 15 times greater than that of the indigenous forest which they are replacing. The deep volcanic soils on which the plantations are being established are capable of sustained cropping, although recent research work suggests some fertilizer application may prove neces-

sary between rotations. Two points of general interest arise from this project experience. The first is the role which such compensatory

plantations can play in relieving the pressure on indigenous catchment protection forests. It is from the 2.4 million ha of indigenous forest that most of Kenya's important rivers and streams originate. Prior to the fifties, more than 90 percent of timber production came from these indigenous Timber-concession licences had been allocated under long-term contract arrangements covering most of the accessible forest area. Today,

in 1980, the compensatory plantations which have been established in Kenya - and cover less than 10 percent of

the former indigenous forest area are supplying more than 80 percent of Kenya's industrial wood demands for both domestic consumption and export. The net effect has been to reduce the intensity of exploitation in the remaining 2 million ha of indigenous forest, the primary function of which remains that of catchment protection.

The second point is it and parcel of this overall velopment programme the estry Department some? established 43 000 ha of a reserves. In the second ! oct financed in 1976, are the loan was that these rebe extended by a further that they would become sentative of Kenya's biols tanical ecosystems. This

A third point of ser relates to Kenya's enlic use policies in the area Because of intense popul and the fact that much is situated on soils of tural potential, the indiareas have always been u for agricultural settleme fifties, a series of long-te tive catchment area studie out by EAFFRO' to est pact on stream flow, soil

Some observations about ag

Because of uncertainties in some of the traditional smallholding cocoaproducing countries, cocoa cultivation is becoming generaphically more wide. ly distributed and is increasingly being grown on a plantation basis, either as a monoculture or under coconuts. In Malaysia, the traditional tree fruits may follow a similar course and black pepper is also seen as a target for the specialist-producer,

This trend cuts right across the emphasis in current international forestry literature on the notential for "agriforestry", that is, simultaneous intercropping of trees and food crops. It is important, therefore, to clarify the difference between these monoculture farming and forestry systems and the in egrated food and tree inter-cropning farming systems practised, for example, by small farmers in Java, in the Kerala region of India, in Sri Lanks (the Kandy Garden System) and so on. The very small farmer of the

humid tropics with less than two hectares of land, typically grows a variety of food and cash crops around and near his house. In Java, the farmer is highly skilled and cultivates rice. cassava, maize, beans, groundnuts and vegetables in association with hananas. plantains, citrus, cloves, cinnamon, pepper, coffee, cocoa and a variety of tree fruits, all under a thin stand of coconuts

The homestead tree lot, so typical of the humid tropics, reaches its highest expression in Sri Lanka, where the "tree gardens" round Kandy present a complex association of cassava, bananas, ginger, plantains and others under a mixed stand of tree fruits, coffee, cocoa, pepper, cinnamon, cloves,

areca nalin and coconul Africa, this sector is rep vegetables are grown in with a mixed stand of a tree fruits, kola and oil E

These small-farmer syst sharply with the simplici cropped agriculture and f tations and by conserismore difficult to modify : Improvement of smallhok those in Java and Niger he possible by the growis planting material over : period of time, but a ca might be achieved by bett marketing facilities. These ulate the larger and mon farmers into modifying th systems to take advantage ter circumstances, but fi

small subsistence famics.

Assistment sedimentation of alternahe land-use systems, including natual forest in an undisturbed state, planution forestry, ten plantations, liveexit and intensive food cropping. it was clearly established, given anpreriate soil conservation measures, casting spacement and other husban-Ay techniques, that tea, for example, ould provide an effective catchment seer without adversely affecting downgram flow and sedimentation. This acg-term experiment was used as a his for a deliberate decision by the Gvernment of Kenya to excise some 11000 ha of forest land in the southest Man Forest for subsequent tea reduction. Tea exports have now nown to be Kenya's second largest sport earner after coffee, generating wise exchange earnings which accent for 25 percent of agricultural gosts and 10 percent of total exxts. Most of the tea industry which

is enabled some 20 000 farmers to

move from a subsistence to a cashcrop farming system is located on what used to be indigenous forest land.

Indonesia: Transmigration II

The Indonesia Transmigration Project, as the Colombian Caqueta Project, concerns the settling of small farmers on acid tropical forest latosels. In Indonesia, the emphasis is on arabic crops, whereas in Colombia it is on livestock.

As part of a long-term transmigration programme, the Gowerment of Indonesia requested World Bank assistance in 1973 for a project to helpresettie incoming families from Java and Ball on fore sites along the trans-Sumatra highway in the Province of Jambi and to upgrade the standards of living of existing families already extended as the site in the same area.

The Indonesia Transmigration

scheme is one of the largest recettiment programmes in the world. Since programmes in the world. Since 1905, successive governments have spensored the migration of poor farmers from the overcrowded islands to relatively under-utilized neighbouring islands, particularly Sumatra. All told, government programmes have transferred nearly a million settlers, and an estimated 2 million leavners.

residing in the Outer Islands are there

as a direct result of government reset-

tlement and associated population

growth. Much of the earlier settle-

ment provided workers for rubber estates in Sunyatra.

In January 1974, FAO undertock a study to identify a possible transmigration project suitable for external assistance, and in 1976, based on the results of this study, the World Bank undesteok in first-phase transmigration project intended to upgrade the living standards of 12 2009 settled families

and to establish a new community for

plantations and agri-silviculture

tisk could still be too high to pertrhange; under these circumstances, me degree of land consolidation and operative farming might be essential fore improved cropping systems the beintroduced.

As a broad conclusion, it seems that : "agri-forestry" farming systems ed by small farmers in Java and ewhere in the humid tropics are I proven and provide a diversified mbination of subsistence, food and th crops which reduce the risks of region and, at the same time, offer ne small surplus cash income. wever it seems nossible that where all farmers have room to manoeuvre dexnand the scope of their cashsping operations, the trend is likely be toward monoculture rather than av from it. In other words in the nid tropics agri-forestry combina-

tions may not always prove to be the most productive small farms.

The distinction between monoculture and intercropping (agri-forestry) farming systems deserves attention because recently there has been a tendency for foresters to jump on the agriforestry bandwagon and promote indiscriminately agri-forestry systems in all areas of forestry development as a means of increasing the productivity of tropical forest lands. A more selective approach seems to be warranted with emphasis on those small farming systems or phases of development in plantation forestry where intercropping of food and tree crops can be of definite technical and economic benefit.

An associated issue is this: if we take a closer look at the potential for introducing agri-forestry in the humid tropics outside the well-eatablished

taungva plantation model and study the cropping pattern being used in such places as Java, Kerala, and Sri . Lanks, we find that most of the trees which are being grown are fruit trees or horticultural crops which traditionally have fallen outside the foresters' province. Clearly, if foresters are to play a more active role in this area. we need to broaden our knowledge of the range of tree crops which can be used in forestry and to work in closer association with tropical agronomists who are familiar with such crops. We will also have to accept that this is an area in which the forester may often have to play a supporting role to the agronomist and agricultural economist rather than the converse. Investment in traditional forest tree crops will frequently, but not always, be a rela-

tively low proportion of the cropped

area and of farm investment costs.

4 500 new settlers. New migrants were provided with five ha of land, of which 0.5 he was already cleared and 1.0 ha already planted to immature rubber. A second-phase project is now in progress, building on the experiences gained. A smaller farm size (3.5 lia) is being adopted.

The most controversial issue has been the question of the sustainability of the cropping pattern, taking into consideration the highly acid nature of the forest latosols, deficient in nitrogen and phosphorus and possibly low in notassium. Earlier research showed that soil structure is favourable to plant root formation and that by adding regular fertilizer inputs some of the forest soils would become suitable for upland food crop production. To combat the high phosphate fixation, the initial phosphate application should be heavy. Nevertheless, no technical package involving a high degree of dependence on annual food crops has yet been proved over a long period of time.

The cropping pattern originally envisaged under the project allocated 3.5 ha of land per family, of which two ha were for food cropping and about 1.5 in for tree crops (mainly rubber), the latter to be grown as a monoculture. Land clearing was to be carried out by a combination of mechanical and hand methods and 500 kg per ha of rock phosphate harrowed into the soil just prior to settlement. The main food crops to be grown were rice, maize and cassave and it was assumed that settlers would establish house gardens containing vegetables and tree crops such as encounts. cloves, coffee and bananus and different fruit trees. Special provision was made in project design for ensuring that farmers would have adequate supplies of fertilizer, that there would be a framework for close coordination of the various government agencies involved in providing extension support and that seed and planting materials would be readily available for the farmers as and when needed. A staffing ratio of one sericultural extension worker per 500 families was planned (higher than in similar projects elsewhere), as well as a strong emphasis on training.

Despite these provisions, a recent review of project progress has highlighted the fact that incoming settlers are having difficulty in producing enough food crops to ensure subsistence and in securing the necessary inputs, such as fertilizer and improved secrets.

The key policy issue is whether there is any practical alternative to forest settlement in Indonesia in the light of increasing population pressure on the limited areas of good soil. The "alangalang" grassland a areas and the "Cerrado" region in Brazil, for example, could in theory provide a short-term alternative to continued forest settlement and allow more time needed to develop sustainable farming systems for the tropical forest latosols. However, in practice, a sustainable farming system for the "alang-alang" grasslands has not been developed. The scope for more intensive research in

The question has sometimes born raised by environmental and both ragarcies as to why the World Bank situations where there are significant ecological risks retinent projects in that spontaneous settlement as a result of population pressure is essuit of population pressure is essuit of population pressure is of the sense of title in many tropical situations, has been going on for many quantities and in some cases is beyond government control.

this area is a matter of high priority.

By scrively working toward improvement of existing farming systems, upgrading of extension services, arrange of a ready supply of agriculture inputs, and supporting more intensive agricultural research, the chances the experiment research, the chances the experiment of the experiment of the experiment of the experiment to proceed unchecked — would leave affected unchecked — would leave without extension services, roads, and without extension services, roads, and all services and marketing and other coll services and marketing and other coll services and marketing and other services.

As was noted earlier when dealing with the Malaysia Jengka project, it seems important to keep in perspective the fact that part of the remaining tropical forest ecosystems could be put to more productive and sustainable land use, for example, by converting it to perennial agricultural tree

crops and thereby providing of small farmers with a visible of native to shifting cultivates.

Philippines: a smallholds tree-farming project

The unique feature of fit is bloider tree-ferming project is 4 with the exception of a p(c) (Oujurat State, Indin, it is the Cujurat State, Indin, it is the State of the World Blak, Indin where small fatmers are governed to the State of the Cujurat State of the Cujurat State of the Cujurat State of the Cujurat State St

The smallholder tree-faming s ponent is encouraging farmers on ginal agricultural lands throughor country to take up tree familia sociated with food crop ands: for establishment of firewood, a coal, pulpwood and leaf-neal to tions. The project is innosative experimental and is based or Bank's experience of an earlier! million pilot project which por funds for the development of wood resources around the Pi Pulp Mill. The first-phase silet st was successful and has led to a qfind and readily perceivable into ment in the participating furner come and way of life.

Under the second-phase golyo of 28 000 ha of tree-farm dreely to be financed, 10 000 ha si located in Mindanao, 5 000 in Vi and 8 000 ha in the Hocor reginorthern Luzon. Tree-farm size: from two to 15 ha. Futwood charcoal plantations, which so for a high proportion of project 2 average about five ha.

In relation to the likely ingithe project on rural incomes, eence under the Philippins I P is well documented and it would reasonable to anticipate sunt net revenues of something to US\$78 and US\$100 per ln less farms of Albizia producing puly something in the order of U ge ha for tree farms producing fuelies of and charcoal, and US\$300 per ha for farms producing leaf meal (based a Giant Inil-inil).

The financial rates of return to seems are high and the project's ecopair rate of return is something in all returning the project's ecopair rate of return is something in all returning the returning the returning the condition of the returning the returning the seed for greater flexibility in this aga is under review.

pea is under review.

At for ensuring that forests are jestified, the most interesting feature of the Philippines smallbolder tree-faming experience is that it is mobilizing shifting cultivators in the regulbilisment of forest cover in for-judy degrated eatchment areas. The jeed incentive of tree farming is belying to encourage reforestation of world archiments.

Despite the obvious attraction of als formula, there are limitations to as witter application. One of the son problem areas in planning for appasion of the first-phase project gened to be the economic radius for tasisge for pulpwood. Smallholder bee farmers situated outside a 100-km adius from the mill were excluded lecause of the transportation cost betor. Projects of this type are particvarly suitable for establishment of siniations around a central processis plant (whether for the production of pulp, charcoal, power generation. Ecohol, lumber or leaf meal) where here is a gunranteed market price for wood. But all of these different adustries have upper limits of delivmed wood cost beyond which it is not essible, profitably, to process the aw material. In other words, they we primarily suitable for concentrated togurce development within the command area of a processing plant. For his reason, this approach could not be stopted as a "blanket" solution for all proposed forest areas in which shiftits cultivation is a serious problem.

The scope for extension of the Phillytimes experience to other countries is nevertheless, considerable and the World Bank is reviewing prospects for helping some of its other member countries to undertake similar schemes. One of the most effective ways to flave down the rate of trooked forest destruction is to attack the root cause of the problem — rural powerty. If we continue to depend only on exhortations to logging companies, mutilimational corporations and developing-country governments to "Ntop trop-sonal view that we will be no more successful in arrasing the pace of forestry destruction than was King Cannet in trying to stop the advancing waves

To save the tropical forests from further

depletion the focus should be more on how to improve the incomes and quality of life

of the 200 million who practise shifting cultivation throughout

these forests.

by using equally futile tactics. A deliberate shift in conservation strategy is needed to focus more on positive approaches to rural development and alleviation of rural poverty, if we are to preserve effectively what is left of the tronical forest ecosystems.

the tropical torest ecosystems. I have a tempeted to thow that a considerable part of the so-called "fost-destructive training share in the developing world is, in fact, a logical shift in land use to more productive to the state that the state of the state that the state of the state that the state of the state of

seems to be convincing evidence than many of the agriculture and rural development projects already initiated in tropical fereat races have resulted in a quantitiable increase in rural incones; have cnabled they small farmers involved to settle in more stable communities; and have eliminated their former dependence on shifting cultivation, In other words, estilement of small farmers and forest protection need not

be mutually exclusive objectives. In some of the projects undertaken in the past in which land-use and soilcapability surveys were carefully carried out in advance of settlement, and agricultural development channelled into the flatter lands it has proved possible to exclude a large part of the remaining forest from agricultural settlement and this has remained unexploited (Malaysia, Jengka). In other cases, inadequacy of forward planning, or too high a degree of dependence on non-enforceable forestry protection logislation, has failed to protect the forest. This means that project design must be flexible and take into account the needs and aspirations of incoming settlers or small farmers (Colombia, Caqueta).

Because of the wide variation of tropical forest soils, climatic and physical conditions, it is impossible to generalize about appropriate farming systems for tropical forest areas, but what seems to emerge from this analysis is that perennial agricultural tree crops such as oil nalm, coffee, rubber, cocoa, tea and coconut can be an ecologically sound alternative to natural forest management and, secondly, that whatever agricultural crop or livestock or forest plantation crop combinations are envisaged, the capacity of governments to ensure adequate support services, inputs, such as fertilizer and seeds, agricultural research services, feeder roads, social infrastructure and marketing outlets constitute a decisive factor in determining whether a particular farming system is sustainable. Even in the most intractable soils, such as those of the Amazon, evidence suggests that, given appropriate attention to soil conservation measures and crop husbandry techniques, it may prove possible to sustain arable, and even livestock farming, systems on at least the better endowed of these lowfertility soils where, in the past, all such attempts have failed.

Because market constraints for plantitude, govern agricultural and forest true copy will probably limit their development to something less than 10 perceast of the remaining tropical forest ecosystems between now and the turn of the century, high pelority should be given to agricultural research and to pilosiscate development programmers similar al importing the present state of intervience of surdistraint to additing agriculture and, in this intertim, directing settlement to better solits.

In watershed areas, an integrated rural or "area" development approach which offers the small farmer an alternative to his ecologically destructive way of life can help to preserve the remaining forest and, thereby, reduce the risk of soil erosion and downstream flooding. Investment in such infrastructural "inputs" as a supply of seeds and fertilizers, torrent-control structures, soil-conservation measures, provision of credit, training of extension staff, feeder roads, marketing services, achools, shops, hospitals and other social services is the quickest and most cortain way to ensure that farmers abandon shifting cultivation and adopt a more sustainable farming system. Some agricultural and livestock farming systems with appropriate husbandry practices can also provide effective catchment protection. In other words, forestry is not the only

It is clear that compensatory forest plantations have an important role to play in ensuring protection of part of the remaining tropical forest ecosystem because they can provide an alternative source of timber and take the pressure off further exploitation of indigenous resources. Reforestation programmes in the developing countries are currently proceeding at less than 20 percent of the rate needed to ensure domestic self-sufficiency by the year 2000 and a massive increase in the annual rate of establishment of fast-growing species is called for before smallholder tree-farming can play a significant role in situations where

the forest lands or catchment areas to be protected are situated within an economic haulage distance of a processing plant or each market.

Concerning the problem of the preservation of biotic reserves, the environmental agencies of the world have done a masterly job in alerting international awareness on this matter. It is becoming widely accepted that the arguments in favour of preservation of forest-dwelling hoster/eatherers wildlife botanical genetic resources and potential future drug and medicinal plants are irrefutable and the governments of some developing countries (e.e. Malaysia and Kenya) have expressed their willingness to increase efforts to protect such resources and have created environmental agencies. But the only certain way we have of ensuring that these designated biotic preserves will be protected in practice is by increasing appropri for rural and agricultural development programmes

in adjacent areas. Foresters might repard some of the projects described here as agriculture rather than fores:rv projects, and it is precisely at that point that problems can arise. Foresters in the past, have tended to be highly parochial about defining what constitutes a forestry project and to assume that their responsibility starts and ends with the cultivation of forest trees in forest reserves. In fact forestry investments are likely to comprise a relatively small proportion of many of the rural and agricultural development projects which will be needed to bring the corrent process of tropical deforestation under effective control. In the area of catchment and agri-forestry, in particular, foresters will have to be prepared to work more closely with aericultural settlement and other agencies, playing a complementary and supporting, rather than a predominant, role in the de-

velopment process.

Concerning the World Bank's role
in forestry projects, we are conscious
of the fact that the Bank's efforts in
this area can only be marginal and
that the main impetus must come from
within the developing countries themselves. Following publication of a
Bank Foestry Sector Policy Pager in
1978, the Bank made a major shift in

emphasis of forestry lending too environmental and rural foresty set as a goal a five-fold increasing level of forestry lending to silver target of US\$500 million with a five-year period 1979-83. The good of the developing countries loss services has been encouraging to 1978 we have made loans to free projects in about 35 different owns and more than 60 percent of the have been for programmes sirely environmental protection and to sion of fuelwood, fodder, balls poles and other forest products and both for basic subsistence and do coment. The US\$500 million last target has been achieved sered ahead of schedule.

In future forestry lending with tend to give special emphasis to tershed protection, renewable exce related reforestation programmers fast-growing species, and to se holder cash-crop tree farming in reareas. Of the US\$3 thousand mili a year which the Bank is come lending for agriculture and rural velopment, part will continue to directed toward pericultural sciritor and watershed protection. Althor primarily aimed at reducing rural to erty, such settlement projects show make a contribution to preserving of of what remains of the world's tree forest ecosystem.

- Footnates
- See "Land use in Amazonia" h cific Viewpoint (19), 1978.
- See Pasture production in ocid si in the tropics. CIAT, 1978.
 See News. 015 of 1963, 141 of 18.
- and 216 of 1965; and articles that 15 of Special Decree 2278 of 193 4. East African Agriculture and faestry Research Organization look
- in Nairobi, Kenya.

 5. Forest lands formerly under hits cultivation now abandoned and six have reverted to a coast gassas

CECCTON VYXII

ercise I Lecture on Agro-Forestry

gal Time: 2 hours

prview

This new discipline in forestry is introduced and the septs of agro-forestry as related to the Peace Corps Volunteer spresented. It is pointed out that this field, although not sitely new, is new in academic instruction of forestry as a continuous contraction of the property of the subject at this point in time. Perhaps those authors are sent here as participants in this ession.

ncedures

10

Activities

. Agro-forestry lecture: The following is an outline used by Bill Prentice, Agro-forester in the Amazon Basin of Scudor. We present it along with his lecture as a guide for doing this important session.

Lecture: Agro Forestry

AGRO FORESTRY: A Possible Marriage

Page 1 (on newsprint)

"Some ideas on integrated land usage"

William E. Prentice, Puerto Napo, Napo, Ecuador

Page 2

we believe that it is right for a man to strive to better the world in which he lives.

How?

Each tree you plant makes the world a better place.

As a PCV, you can have a great multiplier effect by teaching others to plant and care for trees.

Page 3

- Combining "forestry" with agriculture and livestock.
 - o Possible combinations, o Why do it?
 - o Overcoming resistance.
- II. Selecting the Crops, Horticultural Trees and Animals.
 - o Animals,
 - o Fruit and nut trees.
 - o The birds and the bees,
 - o Fowl play

Page 4

Land usage: Production techniques

forestry, Agro-Silvicultural, Silvo-Pastoral, Agro-Silvo-Pastoral, Agriculture, Livestock, Agro-Pastoral.

Page 5

und usage-various possibilities

Mgricultural - Field Crop Monoculture

- Orchard monoculture
- Mixed cropping
- Polycultures

Forestry

- Reservations
- Conservation
- Plantation single species Plantation - mixed species

Livestock

- - Ranging Pasturage of paddocking
 - 0
 - Confinement Forage and feed storage

Acro-Silvicultural

Animal under trees; regular distribution

- In relay sequence Permanent association

Mimal under trees; irregular distribution,

Worticultural tree with forest trees.

Agro-Pastoral

- Grazing under trees (fruit and nuts)
- Grazino plant rosiduos
- Yowl with resistant crops
- 0 Pigs and fowl (self-harvesting)

Silvo-Pastoral

- Grazing under trees
- Planted forage For weed control

Agro-Silvo-Pastoral

- 0 Annual + trees + animals
- Perennials + trees + animals
- Annuals + perennials + trees + animals

Page 6

Why combine torestry and agriculture?

For greater and sustained production.

1. Economics

- o preater income potential
 - o quicker income
 - O Tesseneo Erak
- Ecological tactors
 - o macro-ecology
 - o erosion control
 - o acsthetic and recreational value

3. Agricultural reasons

- o soil enrichment both chemical and structural
- o vertical integration for better utilization of space
- reduced proliferation of pests and disease
- o more oven distribution of work load

4. Subsistence motive

Can teed one's tamily from the same land that is in tree production.

Page 7

why does the small tarmer resist planting trees?

- l. No tradition of planting trees,
- 2. Accustomed to short range thinking,
- 3. Little investment capital hand to mouth poverty,
- Ignorance of the very good reasons why we should plant trees.
- 5. Very little suport for tree planting:
 - a. Lack of investigation on what species with which to plan possible integrated production techniques,
 - b. Compare tree planting with other land uses; often the tree planting requires less capital and may be just as quick an income producer,
 - c. Trees are security for old age. Do the hard work while one is young and strong,
 - d. Few people plant trees but those who do can expect a good return.

Personally

 Make reterence to the children: "In five years the haby vill be in school. If you plant ___ trees now, they wil pay for his school expenses." 2. Expected life span

"Hasta esto me muero!"

3. What provision does he have for his old age?

GET PERSONAL

Page 9

Lowlands

Selecting the crops, horticultural trees and animals.

Annual Crops

Harvest

Cereals and pulses (legume crops like beans). Can the small farmer compete with machines? Vegetables, fruits and specialities. Labor intensive crops, when land is limited.

	Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner,			
	Pineapple	moderate shade tolerant	18 months	Heavy feeder
	Passion fruit		12 months	Let fruit drop
	Black Pepper		18 months	Labor int. harvest
	Papaya	Pull Sun	9 months	Diff. to estab.
	Plantain	Pull Sun	8 months	Suspt. to nematodes
	Tree Tomato	Shade Tolerant	12 months	Needs pampering
	Naranjilla	Shade Tolerant	8 months	Needs pampering
	Page 10			
FRUIT AND NUT TREES Management				
	Name Time	to Harvest Tree	Size Use	

Page 10				
	FRUI			
Name T	ime to Harvest	Tree Size	Use 1	to 5
Achiote	2 Years	Small	Red Dye	5
Cacao	3 years	Small	Chocolate	3
Cafe	2 years	Small	Coffee	3
Coconut	5 vears	Medium	Nuts raw mat.	4
Citrus	2-3 grafted	Sm -Med	Pruits	2-3
Guaba Inge	4 years	Med-Lrg	Pruit, wood feed	
Guauaba				
Psidium	3 - 4 years	Small	Pood, Medicin Peed	e 4-5
Frutipan Autocorpu	ıs			
Anona	5 years	Large	Food, Medicin	ie

FRUIT AND NUT TREES (Continued)

Name	Time to	Harvest	Tree Size		to 5
Prutipan (Continue Guariaban		5 years	Sm or Med	Feed Fruit (High Value)	4-
Chonta Guileri Gaspid		ears	Medium	Fruit, Palm hearts, wood	4

Page 11

- 1. Make a list of possible crops to choose from and learn about each one,
 - 2. Seek out local expertise and experience,
- 3. Do not jump to conclusions,
- 4. If the crop needs pampering in your area leave it alor 5. Shade tolerance is related to soil fertility,
- 6. Grow what you like to grow.

SESSION YYYTT

Exercise II Agro-Forestry Plans

Total time: 2 hours

Overview

In this exercise trainees' plans are critiqued. Based on lecture in the morning, realistic plans are discussed by trainer with each trainee. Suggestions are given to trainees for possible future use of plan or parts of plan.

Procedures

Time

Activities

 Trainees are divided into groups according similarity of climatic conditions at their future work mites. Trainers return site plans to trainees with notes and they are discussed by trainer (the reason for doing this in groups is that each trainee has seen that the condition of the agrotnostry papers accided during pilot program are enclosed here for samples.

Trainer's Note: It is important that each trainer discuss his/her paper and that trainer responds to it. This may require a second round in the afternoon and possibly the evening.

AGROFORESTRY

(for Southern Manabi)

One of the biggest problems the province of Namabi as a whole faces is one of lack of water. For agriculture, nost results was use irrigation. There are some areas that do not even have permanent water source. In these areas agriculture is impossible and the focus here is to plant trees to control soil erosion, for forage and wood and especially for filewood and charcoal.

In those areas where irrigation is needed and possible, as agnoforestry program can get more use from irrigating the same area. A profitable crop and a usable tree can be planted together and they will receive twice the benefits.

There are many different schemes possible:

One example might be using Temarindo with Sandia. Temarindo is becoming more scarce and an effort is being made to plant note. Although not extremely drought resistant, it is being planted in the drier regions.

Temerindo produces a fruit which is marketable, the [lewers and leaves can be used for seasoning, varnish can be extracted from the seeds, and the hark produces chemicals for the tanning of skins. Ownerli it is a facily profitable tree. Tamerindo requires fairly good solis, deep and well aerated. It also height and provides a lot of shade, where to should leave the height and provides a lot of shade.

Tanarindo should be transplanted to a plantation when the plant is 50 - 60cm tall. Pots are utilized in the nursery.

The spacing of Tamarindo is 8x8 meters or possibly 10x10 meters.

A second crop can be planted between the rows - Sandia has been suggested as a second crop to use. In this way the farmer has two marketable crops available.

One of the drawbacks of this plan is the fact that for two years no other crop can be planted and the farmer has no income from that area for two years.

Other possibilities for agrotorestry in the Province of Manabi include the planting of legumes, acacias with crops. Tooy have deep root systems and many fix nitrogen which would improve the secondary crop.

Another example is the algerobo (Prosopis jutiflors) which has been planted with corn in the first year. After that, the algarcho takes over and the corn cannot compete for mutrients and hence does not survive. This is a good system if the landowner that is a second of the top the second of the

because the leaves and the seed can be used for forage by animals. The seeds can be stored and used during the extremely dry seasons as food for the animals and the wood makes excellent firewood.

for plantation purposes it shoud be planted at 15x15 meters or at 10x10 meter intervals.

Peace Corps Volunteer Anne Wagner contributed this article.

AN AGRO-FORESTRY PLAN FOR THE AREA AROUND QUININDE, ECUADOR

Agro-forestry is a production system that suplies wood, agricultural crops, and/or animal products from a single management unit. In a productive egro-forestry system, good agricultural practices are combined with the efficient use of trees.

A multitude of factors must be considered when planning an agro-forestry system. Primary consideration must be given to the sree's climate, topography, soil fertility, land tenure, proximit to markets, and present and future population pressures. The agro-forestry plan should also include methods for soil and water agro-forestry plan should also followed by the production of the state of the

Crops selected for use should be diversified to reduce the risk of infestation by insects or disease. Chosen crops should have relatively low nutrient requirements and be easily stored, An emphasis should be placed on the production of animal protein from plant products and torage that are of no direct use to man, (i.e., leaves, etc).

In tropical reinforest ecosystems, trees are critical to the stability of the landscape. Trees are necessary in nutrient cycling because rainwater percolating during wet seasons deposits soil nutrients at a depth that only tree roots can reach. This over time, trees can rejuvenate a soil that has been hadly drained of its nutrients.

Today in many parts of the tropics man is producing crops or land better suited for tree cover. An agro-forestry system can remain productive throughout the entire year, resist intestation of parasites, and disease, maintain the quality of the soil and minimize soil erosion.

The micro-climate contained within the tropical agro-trossty system are modified by troe cover, and minerals and nutrients can be recycled by natural processes that utilize organic matter from luving or dead tropical plants, and menue from livestock. Thus, a troylcal agro-forestry system, besides conserving the tropical ecosystem, could potentially yield: seeds, flowers, truits, vagotables, leaves, medicines, resins, forage, firewood, lumhur and meat.

My plan for an agro-forestry system is based on the tropical rainforest area around Guinfinde, a town in Emeraldase province in northwest Ecuador. Quintinde receives over 80 inches of rain annually with a heavy rain season lasting from february through April. while still containing much valuable timber, the province of the province

The major cash crops grown around the Ouininde area are coffee, cocoa, bananas and rice. Oranges, pineapples and grapefruit are also grown. Many of the large haciendas in the area utilize a great amount of land for cattle grazing. There are

large haciendas of 500 to 1000 hectares as well as many small family tarms of 5 to 10 hectares.

My purpose is to introduce the use of TECA (Tectona grandis) and Laurel (cordia alliodora), as companion species of timber to areas of coftee and cocoa production, as well as on pasture land.

Both Teos and Laurel are common timber species growing naturally in the Quininde area at this time. Both species produce wery high quality, marketable timber. Their woods are used for doors, windows, furniture, boat decking, thooring and paneling.

Both species grow rapidly. Teca can reach 6 meters at two years, 10 meters at four years, and 15 meters at ten years of age. Both Teca and Laurel grow in wet soils, which are also suitable for roffer and coops.

Laurel has previously been shown to provide good shade for coffee and coose while simultaneously providing a good source of timer. Peter Weaver, in agri-silviculture in Tropical America, reported the natural regeneration of Cordia alliodora in a coffee plantation at Chinchona, Colombia. At maturity, the trees had a basal area of 20-30 m²/₁₀.

I have observed Teca growing very well on coffee and cocca plantations near Onlinide. Given Teca's enomenus leaves, it should be a reasonabley good shade tree. I suggest using both Teca and Laurel in the appro-forestry system in order to prevent a single intestation of disease or persites from destroying all of the trees ursent.

Thus, I would suggest to tarmers in the Ouininde area that they attempt to intercrop regularly Teca and Laurel with their stands of coftee and cocoa. It may also be possible, depending upon the distance between trees, and the crop species involved, to the company of the company of the company of the company to the company of the company of the company of the company to the company of the company of the company of the company of the the introduction of Teca and Laurel could increase crop yields,

Tace and Laurel torage could be used as animal feed and/or yeen menure. By scattering trees on pasture land, livestock would have more shader areas and treage metrical available. The young enclose livestock, providing torage and shade and decrease the necessity for cutting small trees as teplacement for fence posts. There is a great cheal of pasture land in the Guininde

The litterfall to Teca and Laurel would add nutrients to the soil and could he used to fertilize family garden plots. Their presence would certainly help reduce soil erosion, which is now a very serious problem in the Ouininde area due to the large numbers of trees being out for timber and apricultural purposes.

For this system to be accepted by the campesinos in and around Quininde, a great deal of extension work will be meded to convince the media of the potential benefits. However, given the

extensive timber market in the Quininde area, tree cropping with lucrative timber species should not be overly difficult to promote.

Existing cooperatives would have to be organized so that the entire cooperative is involved in the agro-forestry system. It right be beneficial to start new cooperatives as a means of developing agro-forestry on a community-wice hasis. Nurseries should be developed in cooperatives or communities that are utilizing an agro-forestry system, so that the campesinos will have a permanent supply of seedlings and will learn more about forestry.

Special cases may require a great deal of expensive resources in order to naintain an ango-forestry system. For example, expensive fungicides may be needed to fight fungi that are invading a nursery or a stand of trees. Thus, it is important to consider possible lines of credit or other forms of aid that are maximally be rural tarmers.

Peace Corps Volunteer Daniel Saxon contributed this article.

SESSION XXXIII

Spanish Language

Total Time: 15 hours

Overview

During preceding session, agro-forestry concepts have been discussed, it is important that trainee be able to discuss these concepts in Spanish. This language session is devoted to articulation of sure-forestry concepts.

Procedures

Time

Activities

 Using vocabulary, trainees discuss agro-torestry concepts they have learned in previous session. It is important that trainees he able to articulate these concepts in simple terms because they will later have to do this as extensionists.

Vocabulary

```
Auro-forestry system - sistema auroforestal
Agro-silviculture - agro silvicultura
Agro-pastoral - agro-pastoril
Multiple use - uso multiple
Crop - cultivo
Crop rotation - rotación de cultivos
Environment - ambiente
Polyculture - policultura
Bush - ambusto
To grow - creyer
Overgrazing - pastureo excesivo
Sustained production - producción sostenida
Sketch, rough draft - bosquejo
Sketch - crouuis
Brush, thicket - matorral
Integrated management - manejo integrado
Survival - supervivencia
Habitat - habitat
Shitting agriculture - agricultura nomada
Loan - prestamo
Branch office - sucursal
Once in a while - de vel en cuando
Coffee - cafe
Banana - banano (plant
Coco - cacao
Pasture - pasto, pradera
Grass - pasto
Prickley pear - tuna
Tuna - atún
```

Line - cal (mineral)

Vocabulary (Continued)

Lime - lime (fruit)
femon - limén
Grange - naranjo (tree)
Cherry tree - cerezo capuli (Rouador)
Prop - gota
Turkey - pavo
Sweet potatogs - camote
Fir tree - aheto

SESSION XXXIV

Lesson Plan and Use of Visual Aids in Teaching

Slide Presentations

Total Time:

Goals:

- To instruct trainees in procedures for presenting lesson of charlas;
- Por trainees to practice setting up simple lesson plans to demonstrate to group;
- o To discuss method for making and presenting a slide show.

Overview

During this session, trainees present special projects on lesson plans and slide presentations. This is a fun time and trainees enjoy making up lesson plans. A short slide show is also presented (if slides are available).

Exercises:

- 1. How to make a lesson plan-
- 2. How to make a slide show.

<u>Materials</u>: Flip chart, marker pens, tape, crayons, old magazines, scissors, paste, material scraps and slide projector.

SESSION XXXIV

Exercise I: How to make a Lesson Plan

Total Time: 15 hours

Overview

In this exercise traines for whom lesson plans has been a special project gives a lecture on making lesson plans by demonstrating one he/she has made up using "Teaching Conversation in Developing Nations" as a guide. Trainees them stake up a single lesson plan and jute come induce demonstration of lesson plan they have developed.

Procedures

Time

Activities

- Trainee responsible for lesson plans as special project gives lecture covering:
 - a. Stated objectives
 - b. Present information
 - c. Activity
 - d. Summarv
 - e. Follow-up

Sample of trainees lecture follows

Trainer now gives assignment (or can have trainee give assignment) that everyone is to give a one minute lesson to group. They now have 30 minutes to plan using outline and prepare lesson plan.

30 minutes

 Trainees give either short lesson or they have option of describing a lasson plan they might use in campo. List of lessons given are included for reference.

Short break for setting slide presentation.

List of Lessons

Proper way to use a knife Proper way to tie a figure 8 knot Having children draw leaves

> ""al collection roll

Earthworms flower cycle 5 senses in the environment Proper way to cut a tree Extension of our bodies How to plant a terrarium Names of Spanish tools Lesson plan on pollution Lesson plan on insects Lesson plan demonstration on trees to control erosion Lesson plan on parts of plant Lesson plan on identification of tree species

CONSERVATION EDUCATION

INTRODUCTION - You do not have to be a school teacher to teach basic conservation education. While the school system is the most centralized and organized medium for reaching communities, conservation education should not end there. Simple projects around your home in the backyard are just as effective and serve as an important educational tool when shared with neighbors.

Resources: The background you already have based on your education, readings and experiences should be taken seriously as resource materials. Of special importance is the manual "Teaching Conservation in Developing Nations" which can be ordered from Peace Corps at the following address:

> Peace Corns Information Collection and Exchange 806 Connecticut Avenue, NW Washington, P.C. 20526

Other resources include:

Basic Education Outline - a syllabus outline of basic goals and topics in a logical progression.

I. Looking at the environment

Objectives: To develop an awareness of the environment, To understand some interelationships, To learn how neople use and abuse their

environment.

Topics: Rocks and soils, Plant communities.

> Animal communities. Relationships and man in the environment

Projects: Slide shows Identification - Collections Posters Terrariums

Soil Examinations Planting trees and gardens

II. Changes in the natural world

To develop an awareness of ones impact, etc.

Objectives: To understand life of plants and animals, Topics: Products from plants and animals Everyday activities and how they affect the

environment.

Soil building, What plants need to survive and produce.

Projects: Keep a diary of changes in environment, Erosion Control project - i.e., curvas de nivel, water collection and conservation. Establish a community,

Fertilizer experiments, Evaluation.

III. Responsibility for Environment Conservation

Objectives: To understand responsibilities for use and

management of natural resources, to learn conservation practices,

to learn what local government and national programs are doing.

Topics: conservaton practices and alternatives, sewage and solid waste disposal,

chemicals in everyday life.

Projects: Plots, presentations (store windows),

contact and work with local agencies, map community and do, develop a park with teachings signs.

Lesson Plans

- 1. State objectives
- Present information using visual aids pictures, slides, etc.
- Activity demonstrate construct examples organize mingas
- Summary repeat main points
 Follow-up and evaluation
- Example: Usos de bosque
 Objective: Demonstrar various finificios de las arboles

Material necesario: papel para posters

marcacores cinta admesive o maskino

-225-

Exercise II

Slide Show Presentation

Total Time: 30 minutes

Silve Show Presentation

Overview

Trainee(s) who has taken on slide presentation as special project presents lecture on steps involved. Possibly the(se) trainee(s) could present a short slide show.

Procedures

Time

Activities

ACCIVICI

 Trainee(s) for whom slide show presentation is a special project gives lecture including the following steps:

20 minutes

- a. Before you take pictures b. Taking pictures
- Organizing the presentation
 d. Equipment
- e. Slide show topics
 - f. Photo reproduction stand

Sample follows

10 minutes

Trainee gives short slide presentation to demonstrate lecture.

GUIDE FOR MAKING A SLIDE SHOW

For a presentation on almost any subject, a slide show with iteratures of good quality is an excellent medium. The following as written as a quide to producing a slide show.

I. BEFORE YOU TAKE PICTURES

- A. Planning is very important. State objectives of the presentation. Keep it as specific as possible. Make a list of what you want to show. Research your subject and define specific scenes needed.
- B. Complete charts, posters and book materials to use in the program.
- C. Buy quality tilm from a reputable dealer.
- D. Know your camera and be sure to clean lenses, etc. before beginning.

II. TAKING PICTURES

- A. Action shots showing specific activities involving local people are ideal. Be sure the subjects are willing and explain why you are taking the shots.
- B. Watch the hackground. Keep the focus of the shot on your specific subject.
- C. Lifting yraphs and charts from books can be very useful. Almo, original drawings can be changed to slides simply. Excellent title slides and conclusions with written summaries can he made by taking a photo. A simple stand can summaries can be made by taking a photo. A simple seems to see sketch #1). Close up tubes (autometic extension tubes) can be used to lift photographs for slide production. The slides can be made to look as if they were taken on location. Por copying slides, attachments are evaliable noation. Nor copying slides, attachments are evaliable need to rely on costly slime reproduction processes. In essence, you are taking a slide of a slide.

II. ORGANIZING THE PRESENTATION

- A. Written script Scripts should be direct and concise. The presenter should take the time to review the presentation several times prior to the show (practice makes pertect!). Either an entire script can be written or note cards utilized.
- 8. Tape recording accompaniment There are both pros and cons to a slide show including a tape recorded script and/or music. On the positive side is the ease of presentation. A taped script with music background may be more interesting

to the viewers and appear more professional. A recording made by a local speaker may also alleviate language difficulties.

- A few problems could arise due to:
- 1) difficulty in stopping to answer questions.
- 2) possible difficulty in coordination of tape with slides.
- 3) costs.
- 4) more equipment and electrical outlets needed.

It you decide to use a tape system, make sure that the speaker has good diction and uses the language indigenous to the area (In Ecuador, costal Spanish differs from that of the Sierra).

IV. EQUIPMENT

The list of equipment needed can vary with the needs and resources available for slide show production.

Some equipment to consider is:

- Reliable 35mm camera Although not necessary, many options are available to a user of a SLR 35mm camera such as:
 - a. teleuhoto lenses
 - b. macro lenses
 - automatic extension tube sets
 slide copiers
 - e. light filters trom skylight to polarized to infrared f. wide angle and fish-eye lenses
- Slide projector A carousel type with a remote slide advancer is best. It would be easier to have enough carousels to enable you to store the slide show directly in the carousel.
- Tape recorder if you prefer "canned" slide shows a tape recorder which is easy to transport and use is needed.
- 4. Quality tilm and tapes If the project is a large one, you may want to consider buying in bulk from a photo outlet. This would be cheaper in the long run and the majority of times results in the best quality (fresh) film available.
- Extension cords Many slide presentations have been inconvenienced or even ruined due to the lack or nonexistence of electrical outlets and extension cords.

v. SLIDE SHOW TOPICS

Following is a list of slide show topics which we feel would be useful to Peace Corps foresters.

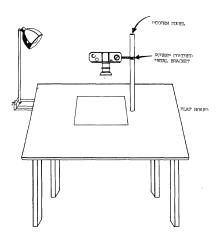
- Starting a nursery The following factors could be used as individual slide shows or incorporated into a single presentation.
 - a. site selection
 - h. seedbed preparation
 - c. seeds
 - d. planting
 - e. maintenance
- Agro-silvicultural systems Specific systems could be handled as individual shows or could be used to present an overview of agro-forestry for any given area of the world.
- 3. Planting and transplanting a tree.
- 4. Types and uses of various tree species Trees provide much more than just wood; from oils and resins to wildlife, food and cover. This show could cover specific species or organize an overview.
- 5. Pest control Forest pests throughout the world cost millions of dollars annually in terms of wood products lost and the associated costs of their supression. This prosentation could deal with identifying when there is a problem, the causitive agent and possible remedies.
- 6. Exotic tree species In some areas of the world, exotic trees are a necessity in reforestation projects. A show could help promote the tree's usage and deal with any special management problems.
- 7. Compost Its benefits and usage. Extremely helpful for areas where the use of inorganic fertilizers can not be afforded. The show could demonstrate how to start a compost pilo, maintain it, and use it for fertilization.
- Brosion and its control This could deal with the problem facing most developing countries, the alarming rate of land loss due to erosion by water and wind and ways in which to deal with it.
- Land management The aspect of total land management including management of agricultural crops, animals, forest, and pasture could be presented to the people to demonstrate better use of the land.

10. Chainsaw use and madesty - Modern harvesting methods are on the increase in developing nations. With the increase in the use of machinery cores the increases risk of accidents and injuries. This show would come the sate use and operation of the hasic "mechanized" tree harvesting tool.

These topics are some of our suggestions. Many possibilities exist for quality shows which can aid our work in the developing countries. It is up to us, as volunteers, to recognize the need and act accordingly.

Peace Corps Volunteers Terry and Bob Simeone and Mark Jackson contributed to this article.

GOOD LUCK



(Fin. 53)

Small Research Projects

Total Time: 2 hours

Goals:

- To introduce the steps necessary in undertaking a small research project.
 - o To review record keeping.
 - For trainee to look at research projects that are under way at local viveros.

Overview

Small research projects are introduced in this session. The various steps for implementation of project are discussed and the necessary records presented. Trainees will go on a walking tour of research projects underway in a local vivero. (If there are no projects to be seen in the local area, trainer can describe research projects with which he/she is familiar).

Exercise I: Lecture on small research projects and walking tour of local projects

Materials: Flip charts, marker pens, tape.

stal Time: 2 hours

Small Research Projects

parcise I

I IIIid. I mout

merview

Technical trainer gives lecture on small research projects. S'lews record keeping in conjunction with small research projects at takes trainees on walking tour of local research projects to illustrate points made in lecture.

mcedures

me

Activities

minutes

 Trainer/technician gives lecture on small research projects using following outline posted on newsprint.

- I. Planting design: Each species in 20m squares planted 2m x 2m
- 100 trees/block

Measurements only taken from trees within the dott line to try to limit "side effects"

x	x	x	×	х	x	х	x	х	x
× i	×	x	x	x	×	×	x	×I	x
× I	×	x	x	×	×	x	x	×į	x
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×	х	x	х	x	x	x	x	×	x
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x	×	×	× _	×	x	×	×_	× 1	x
x	x	x	x	×	×	х	×	x	x

$20m^2$

- 11. Block design 8 species 1 control
 - A. All locations on same soil type
 - b. All plots subjected to same conditions (e.g., exposure)
 - C. Three replicates per species

1										11		
5	8	1	6	7	4	6	3	5	3	7 8	3	İ
2	8	5	2	4	1	1	4	6	2	8	7	

Method of Designating Species to Block

- a. Designation of number to each species
- P. radiata
 P. ponderasa

5. E. globulus 6. E. regimens

3. P. patula 4. P. pocarpa 7. E. ------8. E. -----

b. Designate species to blocks:

- 1. Put pieces of paper in hat (or cup) from 1 12.
- 2. Put pieces of paper in cup or hat with names of species.
- 1st cup number gives column, 2nd cup number gives species, flip coin to get row, (Heads row 1, tails row 2).

Example: Nursery Experiment

Problem: To test different fertilizers (3 types) with three different dosages.

Measure:

- 1. Survival (germination) might not be related to
- treatments, note whether trees are dead or alive 2. Reight growth - each tree to have height measurement taken
- I. Planting design

Rows of P. radiata

6	 	 -		 	
١.	 l	 	ļ	 	

(Fig. 54)

Measure trees within dotted line to limit "side effects."

- II. Block design of seed bed.
 - A. Allow same soil type,
 - B. All conditions equal,
 - C. Replicates for each treatment and control.

Method of designation of blocks

- A. Number each treatment and control
 - 1. Control (no treatment)
 2. Urea quantity x per area
 - 3. Urea " y " " 4. Urea " 2 " " 5. Superphosphate quantity x

 - 9. " triple "

z

s, Designate treatments for blocks

- 1. put numbers 1 6 in hat (for column location)
- 2. put numbers 1 5 in other hat (for bed location)
- 3. put numbers 1 10 in 3rd hat (for treatment location)

	1	2	3	4	9	
d l	8	2	4	1	9	9
d 2	2	8	5	10	10	3
d 3	3	1	10	6	3	5
d 4	7	В	6	4	7	2
4.5	5	1	6	9	4	7

5 minutes

Once column is full, column number is removed from hat; Once bed is full, bed number is removed from hat; Once same treatment number has been drawn 3 times, it is removed trom hat.

he results of the project will depend on: Keeping CLEAR, GOOD ECORDS.

- 2. At the end of lecture technical trainer reviews record-keeping not only for small research but other record keeping activities that have been discussed or introduced since training hegan. (Trainer can have participants contribute to newsprint list that is partially completed if he/she desires).
- Technical trainer takes group on walking tour pointing out various research projects and asking participants what sort of data they suppose is necessary for each project.

Individual Interviews

Trainer's Note: This session is conducted exactly like session 17, Day 7 except trainers will interview different trainers than previous week.

Soils

Total Time:

Goals:

- o To introduce varieties of soils found in host country.
 - o Soil tertility is explained.
 - o To discuss tertilization of soils.
 - To go through steps for taking soil samples.
 - Techniques to be used in soil conservation extension are explored.

Overview

Technical trainer introduces the subject of soil in host country(ies). Talks about different types, fertility, and fertilitzation as a means of improving soil quality. Explains steps for taking soil samples. Discusses techniques to be used in soil conservation extension work.

 $\mbox{\bf Trainer's Note:}\ \mbox{\bf It may be possible to get a local soil expert to give presentation during this session.}$

Exercise I: Lecture on Soils

II: Movies

Materials: Flip charts, magic marker, tape, movies

Exercise I:

Soil Lecture

Total Time: 1 hour

Overview

Technical trainer introduces soil section of training, covers varieties found in host country (ies), tertility of soils, and fertilization of soils. Explains steps for taking soil samples. Gives examples of techniques to be used in soil conservation extension work.

Procedures

Time

Activities

- Technical trainer gives lecture on soils. This lecture must be country specific and if not, trainess must know how to find specifics on host country. Following is a sample outline for use h technical trainer.
- 2. Slide show.
- Field trips visit to poor and good soil management and the affects on crops.

Soils of Ecuador

A. Sierra Soils

- 1. Volcanic origin.
- Hardpan (cangahua) at varying depths below top soil; hardpan compressed fine (powder like) particles with little structure.
- High elevation there are deep soils of volcanic origin which are very feral.
- In the valleys, the soil is sedimentary from the effects of erosion.

B. Coastal Soils

- 1. Provencia los Rios Best soil in the country is of
- volcanic origin; two to three harvests per year.
 2. Rio Guayas Sedimentary soil from the river delta; fertile and good rice land.

C. Oriente Soils

- 1. Generally poor soils.
- 2. Most nutrients locked up in the biomass.
- 3. Nutrients (especially nitrogen) are quickly leached from
- the soil.

 4. Two areas suitable for crops soil of volcanic origin:
 - . The draws surrespic for crops sort of vercamic orig
 - a. Lago Aqua Coco b. Southern Sector - Zamora
- Silvo-Agro-Pastoral Systems can be used (Trees Crops Pasture) on a rotational basis.

Soil Fertility

A. Generally soil is:

- 1. of low fertility in the orient,
- 2. of high fertility along the coast.

B. Problems:

- 1. Phosphates: Fixes in the soil and becomes unavailable to plants; in places must add up to 300 Kg/ha of Pros.
- 2. Potassium: Also fixes in soil and is unavailable to
- Nitrogen: Easily leached out of soil in areas of high rainfall.

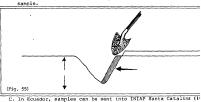
III. Fertilizers

A. Generally, the campesino does not have much knowledge or understanding in the use of chemical fertilizers and/or composting.

- B. Organic Pertilizer: Material generally not available for use as fertilizer; needs more fuel, and/or food for animals and man.
- C. Some soils lack certain nutrients.
 - a. zinc (zn) needed in corn production in the highlands,
 b. sulphur (S) needed in legume production in the highlands.
- D. Most common fertilizer used is super-phosphate simple (P + sulphur).

IV. Soil Samples &

- A. To determine nutrient needs, soil sample should be taken.
- B. Sub-samples of soil should be taken throughout the area of same soil; then mix sub-samples and take a 1 - 2 pound



- km south of Quito); free analysis.
- D. Analysis is free and usually takes 15 days (from time of delivery), but can take up to 3 months. Analysis will include:

E. Analysis of trace minerals can be requested (cost 200 sucres). (Ca, Zn, Fe, Mg, Ca, Mn, B).

V. Soil Conservation Extension

A. Techniques

 Two boxes of soil, one covered with mulch, tilt boxes and put jars at lower end of box. Four water over boxes and observe how clear water fills jar at lower end of mulchified box.

PREVENTION OF SOIL SILTATION

PARE SOIL



(Fig. 56)

MULCH ON SOIL



Exercise II

Movies pertaining to Soil, Soil Erosion and Watershed Management

Total Time: 2 hours

Overview

Since it would not be possible to have trainees see every kind of soil erosion, soil management and watershed management, we showed movies which did give trainess a broad picture.

Procedure

Time	

Activities

 The following movies are shown; technical trainer makes comments and answers questions after each film.

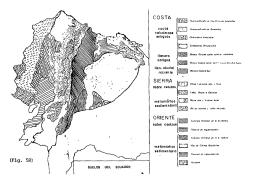
14 minutes a. Soil Brosion
12 minutes b. What is Soil?

25 minutes c. Water movement in soil d. What is Ecology?

Questions and comments take between 5 and 10 minutes

Trainer's Note: You will want to look around for good movies on soil. We only went to one source and found later that there were several we could have used.

· SOIL CHART OF ECUADOR



SESSION XXXVIII

Spanish Language

Total Time: 14 hours

Overview

Following the morning session, trainees should use soil vocabulary in this session. They should form sentences with vocabulary words. In this session, there should also be review of

Procedures

verb conjugation.

Time

Activities

14 hours

- Vocabulary review
 Sentence formation
 Verb conjugation
- Vocabulary (Vocabularis)

Cereals Cereales Ceheda

Wheat Trigo Oats Avena Rye Centeno

Particle - partícula

Sand - arena

Loam - limo

Soil structure - estructura del suelo

Clover - trébol

Boron - boro Maunesium - calcio

Phosphorus - fósforo Copper - cobre

Iron - fierro Watershed - cuenca

Native grass (spreading roots) - kikuyo (Ecuador)

To load - cargar To defecate - cagar

The Potato - la papa The Pope - El Papa

The father - el papa Sulfur - aver-

, marado

Ash, (fire) - ceniza

SESSION YXYTY

Community Analysis Introduction

Total Time:

- Trainees should learn the names of the 14 sub-systems in the social cybernetics framework.
 - o Trainees should be able to define each system and its
 - Trainees should develop a series of questions for inquiry which fit into the categories.

Overview

In this session community analysis is introduced. Building on the extension workers' role, the social cybernetics sub-systems are used in this session because they were developed in Latin America and are widely used for analysis by many institutions in the Inter-American region.

Exercise I: Introduction to social cyhernetics sub-systems.

Materials: Flip charts, marker pens, tape.

SESSION XXXIX

Exercise I

Introduction to Social Cybernetics Sub-Systems

Total Time:

Overview

Social Cybernetics Methodology was developed in South America and has been applied in Central and South America for the last 15 years. In this session, the 14 sub-systems are introduced and defined. Trainess then develop a list of questions for each sub-system that will generate data necessary for analysis of their communities.

Procedures

Time

Activities

- Trainer introduces sub-systems and gives brief lecture including:
 - o The community analysis model with which you will be working assumes that you can break down a community, for purposes of analysis, into a series of segments or sub-systems.
 - a Each segment, in the real world, interacts with the other to produce a continual movement and halance which keeps the community active. The continual movement are active to the will do the same, e.g., if you introduce improved piggery techniques by penning up pigs and feeding them rather than letting them for both a community in the continual production of the continual production.

Cutting across all segments of the community, you will find that there are common elements. These common elements are defined as:

- A. resources (both human, natural and
- manmade);

 B. problems possibly exist problems are defined as the gap between what is and what should be (what "should
 - be" is often defined culturally);
 C. patterns exist which give you clues about what is there, and how persons

perceive them (these patterns of behavior often include cultural habits, as well as biological necessities); and, finally

D. among the human resources you will probably find that <u>leadership</u> exists in many of the sub-areas of the community.

The following model* describes this approach to the community:

SUB-SYSTEMS

Birth, sex, marital status, ethnic groups, habitation, migration, family, relatives, demography, population.

Hygiene, infirmity, hospitals, campaigns, nursing, pharmacy, medicine, dentistry, sanitation, public health, mortality.

Consumers, bars, stores, hotels, diets, food/drink, clothing, warehouse, malnutrition.

Friendship, love, hate, association, clubs, unions, co-ops, federations, societies, solidarity, integration.

Tourism, holidays, games, free time, music/songs, diversions, sports, hobbies, exhaustion, relaxation.

Trips, transportation, accidents, languages, newspapers, broadcast stations, telecommunications, networks.

Culture, teachers, didactics, research, study, school, library, education, academics, teaching.

Public/private property, possessions, assets, wealth/salaries, rich/por, distribution of wealth, stock market, GNP.

Manufacture, enterprises, firms, specialists, departments, arts, technologies, farming, energy, extractive industry. Reli-

gious Creeds, beliefs, participation, churches, ministers,

rites, congregations.

Secur-

ity Police power, combativity, defense, attacks, crimes, violence/war, armed forces, military operations, fear.

Adminis-

trative

Public power, planning, political parties, bureaucracy regime, public administration, government.

Judicial Laws, justice, rights, duties, courts, codes, legal process, jurists.

Status Prestige, respect, merit, competition, privilege, titles, excellence, elites, "who's who", nobel prize, monuments.

Trainor's Note: We have used this model because it is all inclusive of social sub-systems used in social planning, in the Americas. You may wish to use a shorter version called KikEPANI Holistic Nodel, devuloped by Phil Donohue and used in the early 1980's at Peace Corus Training Center, Escondich, California

Explain what each sub-sysis, if necessary.

If you were doing a community analysis, you would formulate a series questions under each subsystem, then try to find answer to the question by yoing into the community seeking information.

 Ask the group to break in small groups of 5 or 6, a brainstorm questions in c area: for example (write these examples on flip chart) as follows:

1 - 1 % hours

Kinship (This has to do with family patterns,

relations and organization)

 How big are families?
 Is the mother or the father the decision maker, land owner, breat

winner, etc.? 3. Who raises the children?

achievo in school?

etc.

Education 1. What is the average grade that ch

-250-

2. Are there schools? etc.

gainer's Note: You have several choices here. Each group may $d\alpha$ is sub-systems or may select one or more them share results with ∂r other groups.

Bring the group together, if appropriate, share questions. If not appropriate, move on to asking people how they plan to find out the answers to their questions.

Hint: There are several methods of yathering data and the group should try out a variety of south of the property of the several property of the sever

N minutes

SESSION YE.

Soil Erosion

Total Time: 4 hours

Goals:

- o Acquaint trainees with local soil erosion problems.
- o Have trainees build oully plugs for erosion control.
- Trainee who has taken this on as a special project gives brief lecture and describes activities.
- o Investigate Vegetation at erosion site.

Overview

In this session trainee who has taken soil erosion as special project gives brief lecture and describes day's activities. Trainese go out in the field and implement gully plug(s); investigate plant life on and near erosion site for mossible planting.

Exercise I: Lecture on erosion: practical erosion control

Materials: Showels, local brush, paste for weaving brush.

(possible to use trees that were thinned in earlier session).

SESSION XI.

Exercise I

Total Time: 4 hours

Overview

Trainee who has previously taken soil erosion as special project, and who has field experience will give short lecture and explain activity before going into field. Then trainees will investigate vegetation and build gully plugs at erosion site.

Procedures

Time

20 minutes

20 minutes

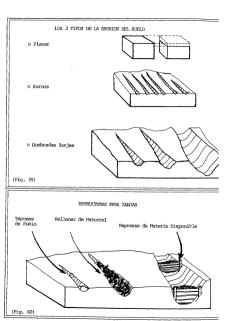
3 hours

Activities

- 1. Trainee gives lecture on site visit.

 Describes activity. Trainees break up
 into groups with forester in each group.
 - Trainees in groups move to erosion site; investigate and record vegetation around site. Each group records their observations.
 - Each group moves to build gully plug as described earlier at place designated by special project trainer.
 - 4. Technical trainer supervises gully plugs. When plugs are completed he/she calls groups together to discuss vegetation in area and to explore methods to be applied in erosion control.

-253-



Spanish Language

": Tire: 15 hours

11.10

Euring this session, trainees are given the following soil that phrases. They are to translate and illustrate each this.

Fara controlar la erosion siembra en curval de nivel, en terrazas o en figas.

Así conservaras la fertilidad de su suelo.

 $\ensuremath{\text{\sc Usa}}$ las terrenos planos para cultivos anuales que necesitan carpidas.

Los terrenos muy inclinadas debes cubrirlos con montes o pastas.

in this session trainees prepare simple charla on building gully $\mu_{\rm p}$. Charla should include directions.

Fracedures

Activities

1. As described in overview.

SESSION VIJI

Problem Analysis

Total time: 2 hours

Goals:

- Using same cybernetic social sub-system as used in session 39 trainees do problem analysis.
- Explore possible solutions measuring each solution for impact on 14 social sub-systems.

Overview

Building on community analysis from session 39, trainee should analyze problem using the 14 social sub-systems to discover resources, patterns, and see how possible solutions affect other segments in the community. They may also discover possible support for solutions.

Problem Solving

ptal Time: 2 hours

wrview

In this session trainees work further with the 14 social glernetic sub-systems to see how each problem and each solution macts on sub-systems other than the one with the original woblem.

hocedures

mercise I

tine

14 hours

Activities

- Trainer describes the following problem solving system to group (place on newsprint).
 - a. Problem identification
 - b. Information gathering
 - c. Pre-conclusion (hypothesis)
 - d. Diagnosis
 - e. Brainstorming
 - f. Decision making g. Planning
 - h. Implementation stages

Trainer now gives the following

We are going to give you some problems we have identified or, in other words, step one. You will check problems with 14 sub-systems to see how many are affected. This is step 2. Step 3 will be your preconclusions and will have to include some assumptions on your part. Step 4 will he your diagnosis of the problem. Step 5 you will brainstorm for possible solutions. Step 6 you will decide on one solution and once again see how solutions will affect other sub-systems. Step 7 you will decide how your solution could get implemented. Step 8 try to look at what steps would have to be taken in implementation and what other sub-systems might be involved.

You will list all steps taken on newsprint. At the end of this exercise you will describe to the group your 8 step process. Each group will have a different problem on which to work. Trainer's Note: We have listed several problems that volunteers have faced during their service. You may wish to add others.

Groups now describe on newsprint, the problems and process they used as a

30 minutes

group.

3. Trainer summarizes, emphasizing that

5 minutes

 Trainer summarizes, emphasizing that there is no way to effect just one sub-system with a solution as there is no problem that effects just one sub-system.

Possible Problems for Analysis

 In a small community a neighboring large land owner has iffered a piece of land for a forestry project. The PCV has quanized the group and since everything except the final strangements for purchase of the land was ready, the group decided to proceed with planting one hetere of trees.

But after a year permission to purchase the land had not been arranged. The landowner therefore decided to sell his land and move to the city. The new owner refuses to recognize the value of the trees planted and the group is angry with the PCV.

 A PCV organized a tree planting project on the land of the local school and together with the students, planted seedlings.

The teacher gave permission to the president of the "PTA" to graze his sheep in the woodlot and many small trees were killed.

j. The head political person in town (temlente politico/in-tendente) owns a good stand of timber which he wants to clear. He make the PCV for advice and help in the project. At tirst it sounds like a good extension project but it becomes clear that he intends to burn all the timber to clear and plant crops and only wants the PCV as free labor to supervise the workers.

4. In a small community a PCV has established a forestry nursery with good results - largely due to the help of the president of the Town Council who got tencing, water and wages for the laborers from the town budget.

When the trees are ready for outplanting the president comes to the PCV and asks for 2000 free trees for planting on his own tarm.

 A forestry co-op planted 5 hectares of community owned land in trees. After five years a PCV was assigned to the co-op to help thin and prune.

To facilitate care and to motivate them, families were ssiyond equal lots to manage and use. Then a high power electric line was built through the trees wiping out two family lots. Those people came to the PCV asking her to help them get rights to trees from the other members.

6. Atter six months of hard work in developing an interest in forest nanagement and success in establishing a nursery, your project is going full speed. Seeing this success your counterpart is getting nervous and realizes he is going to have to spend more line on the project than he anticipated/or else look very bad. He squeent that you be channed to enother site. In your community there is a high interest in tree planting and land is available. A meeting was called to discuss the project and Juan Vasquez was named project chairman.

After the meeting you learn that Juan Vasquez has very few friends. In fact as a store owner who sells on credit, almost everyone owes him money and is intimidated by him. It is clear that the forestry project will not prosper under Juan's leadership.

SESSION XLITT

Wateshed Management

Total Time: 2 hours

Coals:

- Further discussions on soil erosion control.
- Flood control measures.
- Introduce high quality water concepts.

Overview

In this session, we discuss further soil erosion control, flood control measures, and high quality water production.

- Exercise I l. Lecture on watershed management.
 - Possible watershed management projects at trainees' site.

Materials: Flip charts, marker pens, tape.

SESSION XLITT

Exercise I Watershed Management

Total Time: 1 hour

Overview

Soil erosion control, high quality water and control flooding are the topics of this lecture on watershed management.

Procedures

Time Activities

Technical trainer gives lecture

I hour as follows:

Trainer's Note: You may want to bring in an expert to do this lecture if technical trainers do not feel competent to cover this session. If technical trainer does cover this lecture, you may want to use slides or movies to illustrate points.

Watershed Management

Soil Erosion Control

jactive - To produce high quality water and control flooding.

To accomplish this requires integrated management of cropland, rangeland, pastureland, forest land and urban development.

For forest land, this objective often differs from that of timber management. $% \begin{center} \end{center} \begin{center} \$

Timber management is producing the most commercial wood that can be grown on a W/S, managed on a sustained yield basis, and harvested at regular intervals.

In contrast, W/S management could be total protection with no timber harvesting or other disturbances.

Generally, however, good timber management is compatible with W/S management.

ects

Two aspects of W/S management are:

- (1) Watershed protection, and,
- (2) Flood prevention.

tershed Protection - is accomplished by applying land treatment isures such as tree planting, contour farming, pasture planting, n control, debris basins, streambank stabilization, etc.

<u>ood Prevention</u> - is accomplished with flood water retarding ucture and stream channelistations. PCVe will be invovaled in sprawming and applying forest land treatment measures, for tershed protection. They normally are not involved in flood evention so this will not be discussed further. Since much of volunteers' tree planting will be done on steep, badly eroded leides, the following two supporting conservation measures marRON as using both in their forestry program) are valuable to

- (1) gradonis and,
- (2) bench terraces.

adonis - are small terraces that run level or nearly level of the state of the property level (see Fig.61). See the property of the property

eir purpose is to change a steep slope to many continuous flat opes and to change long slopes to a series of short slopes, thus) trapping run-off and infilirating it into the soil to aid in

seedling survival and growth, and (2) reducing erosion and sedimentation (see fig 61).

Gradonis are needed, but not limited to planting sites that recieve less than 800 mm (32 inches) of rainfall per year. That can be built on slopes up to 35° (70%) but are better suited to slones of less than 30° (58%).

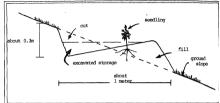
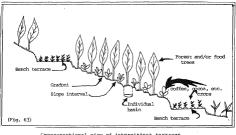


Figure 61. Cross Sectional View of Gradonia

Gradonis Spacing - is determined by the desired tree epacing usually 2 x 2 or 3 x 3 meters. The closer spacing is recommended on the critical eroding areas to obtain a quicker crown closure and litter (much deposit on the forest floor). The trees can be thinned as needed to maintain plant vigor. The thinnings can be utilized for fuel or other uses.

Due to slope conditions, the gradonia often come out wider than the desired enacing. To have complete land utilization or a fully a better or substitute gradonis should be used as w.

Bench Terraces - Bench terraces are too expensive to construct for forest plantings alone. They are, however, used in agro-forestry projects (EMDEFOR is experimenting with them). Crops are grown on the bench terraces; trees are grown on the slopes between the terraces. For additional soil stabilization, the trees should be planted on gradonis also. This practice affords needed W/S protection while allowing the landowner to farm part of the land. See Pig.63.



Cross-sectional view of intermittent terraces

Individual basins can be substituted for the gradonis. Round basins are constructed (about 1m in diameter) with a 10% back slove. The trees are planted in center of the basin.

General specifications for bench terraces - The terraces can be constructed by hand: this provides additional employment for local villagers. Figure 64 shows the cross sectional view of a bench terrace.

(See Pigure 64 on following page)

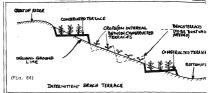


Figure 64 Cross-sectional view of bench terrace

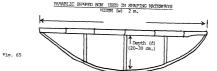
Bench Terraces should be no longer than 10 meters - runoff from longer terraces is difficult to manage. The horizontal grade of toe-drain is 1 percent to safe outlet (waterway).

If topsoil is available, it should be cut away and put to one side and spread hack on the terrace when it is finished.

The top (first) terrace is built just below the ridge. Downhill spacings of the other terraces is 3 times the width of the previous bench terrace.

<u>Num-ott Disposal</u> - Excess rum-off is inevitable and a protected waterway is needed to drain it safely down the slope. A natural depression -not a large gully- can he used. It must be reshaped into a parabolic shape and sprigged with a soil binding grass (i.e., kukiyu grass). The sprigs should be about 15 cm apart. A light nulch and fertilizer will help to establish the grass.

A parabolic shaped bow - used in shaping the waterway can be made from bamboo or other materials. A parabolic shaped bow is illustrated below.



The rear part of terrace, called the toe-drain, functions as a drainage ditch toward the waterway.

In order to avoid overbuilding and excessive expenses, the following principles should be observed:

- 1. Divide rather than concentrate runoff, if possible.
- Use adjacent, well protected grassland or forest land to diffuse run-off.
- 3. Use locally available materials if cossible.
- Select suitable waterway sites carefully to reduce construction cost.

Structural measures may be needed on slopes over 20% or where flow velocity exceeds 1 meter/second.

Costs - Cost depends on slope, soil, type of betrace, width of terrace, presence of rocks etc., and the tools used to huild them. Intermittent hunch terraces, including waterways must estimated to cost about \$250 per heterac (125 man-days). Gradonis cost about \$180 per hectare (about 90 man-days). A man with hand tools can move, in the average, 4 cm³ of soil in 8 hours. Actual records, however, are needed before detailed costs can he settimated.

SESSION XLIV

Spanish Language

Total Time: 15 hours

Overview

One of the objectives of this program is for trainees to be able to deliver charlas on scennical subjects at their sites. In the control of t

Procedures

Time

Activities

- Charla assignments are given. Possible topics;
 - 1. Ten reasons we need trees,
 - 2. Preventing soil erosion.
 - 3. Why host country is involved in forest

Vocabulary

To fill (with earth) - rellenar Gully - carcavas

Sodium - sodio Sand bank - banco de arena

Sediment - sedimento Hardpan - durapan, capa enduricida, conquil (Ecuador

marqpan - durapan; capa eno: Flood - inundación Fertile soil - suelo fértil

Horizon - horizonte Dike - dique

Dike - dique Parent material (rock) - material original; roca madre

Oxygen - osigeno Carbon dioxide - dioxide de carbono

Root system - sistema radical Wave (water) - onda

Water fall - cascada, salto de agua, caratatas (large)

SESSION XLV

Review of Expectations - Mid way

..est Speaker (to be announced)

otal Time: 3 hours

23181

- To review trainees' expectations from Session I. Assessmeent of objectives, directions.
- o To have input from host country speaker.

verview

- :xercise : 1. Review expectations
 - 2. Presentation from host country guest speaker

materials: Trainees' expectation list from Session I.

SESSION YLV

Evercise T Trainee Expectations

Total Time: 45 minutes

Overview

At this mid-point we review trainees' expectations. We look at whether they are realistic and whether they will be met later in the program. This is a good time for trainees to see how much progress they have made.

Procedures		
Time	Activities	
5 minutes	 Trainer asks groups to form as they di the first day and look at their expectations. Ask yourselves the following questions (posted on newsprint). 	đ
	a. How many expectations have been met	?
	b. Of those not met, are they realisti of this program?	С
	c. Which ones are not yet met?	
20 minutes	Groups assess expectations and discuss them using questions posed by trainer.	

15 minutes

3. Groups report findings to entire aroup. 4. Trainer responds, points out expectations that could possibly be net in future sessions. Reminds trainees of their responsibility for their own

5 minutes

education process.

SESSION XLV

gise II Guest Speaker(s)

d Time: Open (not to exceed 3 hours)

riew

he found that lecturers who were asked to speak, unless they experts (and we recommended experts in some previous sions), were unable to cover the necessary material. However, sileve there was value in having host country nationals as the trainees, and we did not want to inhibit speakers by guidelines. Here we suggest that one or more host country join in the forestry field be asked to address the trainees in ir own language.

edures

Activities

 Invited guest(s) speaks to trainers on forestry topic of their choice.

Spanish Language

Total time: Open

Overview

Trainees work on vocabulary pronunciation and form sentences. Review of grammar rules. Summarize host country speaker presentation from previous session.

Procedures

Time

Activities

- Summary of host country speaker's presentation,
- 2. Vocabulary,
- 3. Grammar roles review.

Vocabulary

```
Holes - hovos: pazetas
Growth - grecimento
Yield - rendimiento
Native forest - monte; Monte native; bosque native
Jungle - selva
Woodlot- arboleda
Percent - porcentage
Sod - chamba
Stem - tallo: fuste
Break - quiebra
Small end diameter - diametro el fin inferior
Large end diameter - diametro el fin superior
"r"nk - travoco
    - pudrición
   nk" (fungus) - hongo
    twood - duromen
        old-la
            oura, samago
             amar
              31
```

Sow - sierra, serrucho
to measure - medir
Choker - tecla, estroho
Understory - sacobasque, bosque bajo
Utilization - utilización
Supressed - suprumido
Dominant - dominante
Codominant - codominante

Vocabulary (continued)

Statistics - estadisticia Rotation - rotación To graft - injectar Graft - injecto Swamp - pantano Bud - uema, brote

SESSION XLVII

Species Report

Total Time: 2 hours

Goals:

- o To receive each participants' species report.
- o To have reports presented in a creative and interesting way.

Overview

In this session, individual species reports are received by group. A trainee who has taken this project as a special one is in charge of the session.

<u>Exercise 1:</u> Special project by one of the trainees; presentation of species report.

Materials: Individual species reports.

SESSION XIVIT

Species Report

Evernise I

Total Time: 2 hours

Overview

Trainee for whom this session is a special project introduces species reports. Trainee gives brief overview of guidelines used. Trainee is asked to present these reports in an interesting and creative way, ensuring that each report is introduced.

Procedures

Time

Activities

 Trainee reviews task and details quidelines used.

5 minutes

2. Reports are introduced.

Trainer's Note: It is hoped that you will not have to sit through 30 or 40 spacies presentations; keep a list of pertinent points since everyone needs greatice in making presentations. There is some risk in cloing this but the creativity of the trainees in a pilot program convinced us that as long as species reports were estowological presentations were effective.

SESSION XLVIII

Porestry Issues

Total Time: 4 hours

Goals:

To have forestry-issue group make presentations of forestry matters as assigned.

Overview

Traines who has taken on forestry issues as a special project, nanayas the presentation. This is a very interesting section and time for questions is allowed atter each group completes its presentation. Traines/granaper has been encouraged to have presentations carefully planned and presented creatively. Trainess turn in paper at end of session.

Exercise: Forest issues presentation

Materials: Forestry issue papers prepared by trainees.

Exercise I

Forestry Issues

Total Time: 4 hours

Overview

Trainees have worked many long hours on their forestry issue papers. The amount of research will be evident not only in their written papers but in their presentations.

Procedures

Tine

30 minutes per presentation & questions

Activities

 Trainee who has assumed the role in managing forestry issue papers presents schedule. The trainer may wish to have trainees respond to each presentation; if so, the respondents should be prepared in advance.

Sample of trainee/manager presentation follows.

Why Forest Issue Paper?

- 1. To study forestry issues related to the economy.
- 2. Issues chosen for study are pertinent to the economic aspects of forestry. A sample of these papers is attached for your use.
 - 1. Forest Management,
 - 2. Exotic Species vs. Indigenous Species,
 - 3. Forestry and Community Development,
 - 4. Industry and Jobs vs. Conservation,
 - 5. Cost Analysis, 9. What is Extension?
 - 6. Need vs. Conservation,
 - 7. Forest Products other than Wood. 8. Cooperatives.

Helpful Public Speaking Hints

- ı. Speak slowly and clearly.
- 2. Always face your audience.
- 3. If you are reading, try to establish some eye contact. Try to read slowly and change the wording so it seems more
- like you are speaking "off the cuff." Know your notes. Make sure that they are legible. 4.
- 5. Do not put barriers between you and your audience, e.g., desk.

COOPERATIVES

What is a cooperative? A cooperative is a group of people united in a free and voluntary manner for the purpose of lending services to themselves and the community. The group involved should have a common problem or bond that unites them. Service should be stressed as the main purpose, it should not a be a profit organization. The individual should not be the only one to benefit. The entire community benefits through the clevation of cooperatives dea nd business etnics brought about by an effective

There are two basic aspects of a cooperative: economic and social.

- Bconomic: the cooperative is organized with capital from its members, who are responsible for its control and use.
- Social: the cooperative gives the people the opportunity to exercise their rights while achieving progress.

Guidelines have been developed to explain exactly what a cooperative is. The following are 11 principles of the cooperative movement.

- Cooperatives are self-help organizations. Cooperatives
 exist so that members can overcome their own weaknesses by
 joining others, to become strong through group actions. The
 member is responsible for certain self-help actions which
 increase the power of his/her organization. The members
 must be aware of their standing as co-owners.
- Voluntary association: Members must be allowed to join and withdraw from cooperatives at their own free will.
- 3. Oyen Membership: Membership applications wust not be based on the basis of artificial restrictions such as race, religion, sex, political affiliation or social measure. It may be limited one certain circumstances su to serve unlimited members or limited to cert. professions, inhabitants of certain regions, e
- Political Neutrality: Cooperatives should not attempt to interfere with the political beliefs of their members. Cooperatives should try to remain independent from political parties and the government if at all possible.
- Cooperatives must promote economic efficiency in their negotiations. Cooperatives are business enterprises which are formed to promote the economic advancement of their members. All transactions should be done on a cash basis.
- Democratic Management & Control: Cooperatives are self-governing organizations run by their members. They operate on the principle of "one man-one vote." The members

control the management of their own society.

- Limited returns on share capital: If a cooperative pays any return on invested share capital, it should be on a limited basis to prevent potential members from purchasing large numbers of shares for smenulative numbers.
- Pair and Prudent Distribution of Economic Returns: Surplus funds should be divided on the basis of the amount of business that the individual has with the society.
- Promotion of Member and Employee Education: The cooperative member must receive instructions so that he/she will he effective in the daily functions of his/her society. The employees must be trained so they can effectively fulfill their responsibilities.
- Autonomy: The cooperative must be allowed to enjoy a relative degree of autonomy in its goal-setting and management.
- Cooperation between Cooperatives: All cooperatives should cooperate with others. In this way, cooperatives will gain strength through associating with others who have similar econogic activities.

It should be recognized that these principles are the ideal. Under different circumstances, these guidelines may not be met or may be altered in some respect.

There are several characteristics that a good cooperative possesses. These include a creative force based on individual responsibility and the shility to adapt itself to meet changing methods. There should be an educational system, which should be an economic force. Finally, it must instill the spirit of unselfishness and confidence in one's fellow man.

In working as an extension agent with cooperatives, one should consider several subjects:

The extension worker may benefit by looking at traditional forms of cooperation within the community or region. Possibly, these practices can be incorporated into a framework of action.

Secondly, when no local infrastructure exists for promotion and supervision of a cooperative, or when government officials are unwilling to back the idea; it will probably never yet off the yround and even fail once the volunteer has left. Keep the aims of the project realistic. Do not attempt radical changes in a short period of time.

And lastly, the essence of the extension worker's job in cooperatives is not his/her direct role in specific problem solving. The volunteer's role is to be a guide to cooperative members through problem solving and the utilization of local resources. Stress self-help. Once principles have been understood and accepted by a few people in the community, they can proceed to organize a successful cooperative.

The following information is a basic outline of how to go about setting up a cooperative. Included are some general guidelines for financing and legalizing.a cooperative.

There are two main types of cooperatives: Consumers and Producers. Each is divided into four sub-groups.

Consumers

 Consumer stores: These offer members a better quality of goods at lower prices, and ensure the use of fair weights and measures.

 Credit Unions: Capital is raised by the savings of the members who borrow from the union at low rates of interest.
 Control of credit remains in the hands of the people. Members acquire the habit of saving systematically.

3) Housing cooperatives: the solidarity of nembers usually provides sufficient collateral to obtain a loan to build houses for members. Also through mutual aid and self-help methods, members can greatly reduce construction costs.

 General Services: Include all remaining types of consumer cooperatives. Examples - transporation, health insurance, education.

Producer

Includes producers of agricultural and industrial goods.

 Agricultural sales: Farmers obtain better prices by marketing collectively. They will also sell more as a result of improved techniques that are learned.

 Farmers Supply: Obtains through members capital and loan inputs such as seeds, fertilizer, plows, tractors, etc.

3) Rural Credit: Combats the problem of the yearly harvest heing the only source of income. The source of credit is often supplied by the government, purposes for borrowing are limited.

 Industrial: Workers become owners of their own stores; this type has not developed as rapidly as the others.

Organization of Cooperatives

This is a critical step, as it forms the basis for the working co-op. $% \begin{center} \begin{$

Things to Consider

- 1) What exactly is the problem, and what type of co-op is the rost appropriate?
- Are there desirable conditions in the community for forming a co-op, and what are their strong points.
- 3) What technical aid is available (teachers, equipment)?

When the initial need and desire of a co-op has been expressed by the required number of people, an initial "Organizing Committee" is formed to piece together the necessary information. It is usually made up of 5 members, and has the following characteristics:

Characteristics of Members

- o A true desire to see the co-op formed,
- A willingnes to study, accept new ideas, and work together,
- Devotes much of his/her own time to organizational work for the next few months.

The group should elect among themselves, a secretary, treasurer, and president; accurate records should be taken of activities. The first thing that should be done is a study to determine the availability of human resources.

Information Gathered in Study

- Names and addresses of members of the group and other interested people,
 - Amount of educational work necessary,
 - How many members, how much money is needed to ensure success.

The cooperative idea should be promoted by signs/nosters/notices and by all existing members talking to other community members. If there is already a significant number of members, subcommittees ray be formed to get the job done faster. Credit unions usually need 75 - 100 people; housing cooperatives may have as little as 40.

Any initial capital that would be needed to get things going can be raised by donations or by selling shares to members; each share price is determined by studying economic capabilities.

Education: Members must thoroughly understand the type of organization, since they will be directing it. Laws: The organizing committee must find out legal requisites of incorporation; then write the by-laws of the cooperative. Each member must understand the by-laws and approve of them. They should be sent to the authorities for review.

The Organizing Committee then forms a questionnaire to determine minimum requirements:

Personal: Name, address, occupation, age, marital status, eduation.

Experience: Other organizations, leadership experience, amount of spars time that can be devoted, special interests.

Economics: Monthly total income, surplus for savings, amount willing to invest, credit rating and sources of credit.

Members should be assured that information is confidential, and questionnaires should be analyzed to determine 1) potential members and addresses, 2) list of members who have volunteered for committee work, 3) number of members who will raise necessary capital, 4) capital that can be raised immediately, and 5) amount the committee can determine the initial volume of business. When the committee can determine the initial volume of business. Which objectations may be scarted, the organization the point at dissolved and a board of directors is elected, who will administer the cooperative for the coming wars.

Volume of business will be directly proportional to the humber of members who initially support the co-op. The committee must be careful not to over-estimate the economic capabilities.

Once the initial volume of busines is known, the committee can determine the capital necessary. This includes the fixed and working capital needed to initiate the operation: Invested in equipment and business expenses until the co-op can cover these expenses with its own earnings.

When a realistic estimate has been made, the total capital that can be raised should be compared with the total amount needed to Start operation. If total capital is less, then the difference can be raised either by soliciting more members or waiting until it is raised by monthly pledges.

When the amount of business and necessary capital have been estimated, the committee should form an estimated budget for the first year of operations of the co-op.

Atter this, the organizing committee is dissolved and two new groups are picked: the general assembly and the board of directors. Their members are voted in by majority rule of all members.

The general assembly represents the supreme authority of the cooperative. It meets once a year to review and approve operations of the past year, and plans operations for the coming

year. Each member of the co-op has the opportunity to voice his/her opinion and register his/her vote. Resolutions are taken by majority vote.

The general assembly delegates most of its authority to the board of directors which meets more frequently and hendles problems as they arise. The board of directors is responsible to the general assembly and therefore operates the cooperative in the name of all its members.

The general assembly retains "reserve rights", among which includes the right to suspend or dismiss any members of the best who does not perform his or her duty in the interest of all members.

The board of directors is composed of 5-9 members. They usually serve in staggered 2-3 year terms, at least one being elected each year. There is no financial compensation. Each yearter elections, board members elect a president, secretary and treasurer.

The board of directors is responsible to the general assembly for:

- 1) Administering the cooperative by the majority,
- 2) Meeting at least once every two weeks,
- 3) handling correspondence of the cooperative,
- Keeping records of the board's actions,
 Organizing and planning meetings of the general assembly.

In order to owersee the daily administration of the co-que he board of directors must delegate some of it's authority to manager. The board fixes the salary and outlines the tasks, whether salaries are paid by the co-que depends upon the availability of capital to the co-que and the amount of work to once. Possibly several managers will be needed so that daily cooperative duties can be done while each continues his own livelihood.

- 1) Loans from other cooperatives.
- 2) Loans from cooperative banks, 3) Loans from the government.

Most of the ompital must come from the members' own pockets, because a cooperative is a self-belp programization. If loan capital is used, the benefits which the members receive will be reduced until the loan is paid. Just how much capital must be reased by members and how much may be acquired by loans depends unon the type of Cooperation.

The capital is used to initiate economic operations of the cooperative and consists of:

- Total income: amount members have spent on their cooperative,
 Total income: pays for total expenses.
 - a. operating costs.
 - h. administrative expenses.
 - c. taxes required by law.
- Total income minus total expenses equals net earnings.

These are used to pay:

- a, reserve funds required by law and by-laws.
- b. interest on the member's shares (minimum 6%).
- c. educational fund.

After these expenses are paid, there may be a surplus. This can either be applied to next year's operations, or may be distributed to the members according to their patronage.

At the end of the year the board of directors reports expenditures to the general assembly. This report is drawn up by the manager and approved by both the supervisory committee and the board. It is then submitted to the members for their approval.

The members themselves must be aware of their fiscal responsibilities so that the one-op's money can be safeguarded. They must continually keep themselves informed and use their votes cosponsibilities, the cooperative will benefit, because members will control their own enterprise. However, if the co-op fails, combers have only themselves to blame.

Members also have a collective responsibility to ertain issues upon which the board cannot act. These

-). Approval of the board's yearly plan of operation,
- Approval of yearly budget report,
- Approval of the distribution of surplus,
) Disposal of the assets of the cooperative,
-) Amendments to the by-laws,
-) Incorporation into a cooperative federation,
-) Dissolution of the cooperative, In general, any act which modifies the by-laws.
 - -285-

The leaders of the cooperative also have responsibilities. A leader should have complete understanding of the principles and administration of his cooperative. He must have snequete knowledge of economic principles and understand the innershape competency of the cooperations of the cooperation of

By-Laws of the Cooperative

By-laws vary considerably according to the type of cooperative. There is also a good deal of variation from country to country in cooperative by-laws. Each must be adapted to a different legal code.

My-laws should be ossigned to last the life of the cooperative. Because it is impossible to predict all the problems which will arise in the future, it is necessary to make the by-laws general in nature. They are subject to interpretation by the board of directors or general assembly as specific problems by the companion of the control of the contro

By-laws contain basic rules such as election dates, length of terms, number elected each year, etc. More specific information such as exact procedures for voting and nominating can be reserved for the internal regulations.

Purpose of By-Laws

- Sets forth the general rules for governing,
 - a. legal rights of members,
 b. operating procedures (administrative, financial).
- Il. Legalize cooperative as a business concern,
 - establish operations,
 right to negotiate with third parties.
- III. Incorporate the cooperative,
 - ensure concurrence with cooperative by-laws and legislation.
 - b. register with the proper authorities.

General Contents of Cooperative By-Laws

- 1. Constitution Name of Cooperative,
- Headquarters,
- 3. Objectives.
- A. Social and Administrative

- Members: Membership requirements and rights, loss of membership,
- General assembly: Authority, date of ordinary session, extraordinary sessions and rules of convening the assembly records,
- Board of Directors: Authority, members and terms, requisites duties,
- 4. Management: Manager, authority, duties, dismissal,
- Supervisory Committee: composition, responsibilities, financing.
- B. Financial
- Capital Stock: initial capital, share value, restrictions on use,
- 2. Financing: credit, issuing new shares, special funds,
- 3. Loans to members: interest, valid reasons,
- 4. Accounting: inventory statements balance sheet,
- Surplus: percentage to reserve funds, education, interest on shares.
- C. Dissolution
- 1. Voluntary and involuntary,
- 2. Method of liquidation, 3. Distribution of assets.
- D. Ammending by-laws
- Requirements,
 Procedures.

Legal Aspects

Naturally, the administration and management of cooperatives are affected by laws of the country. Cooperatives are either obliged to, or torbidden from doing a number of things by law. In very few countries, there are no laws and cooperatives come under a loose administration of unincorporated groups of individuals. In other countries cooperatives come under the commercial code. The main difference is in the degree of detail. Some laws are very detailed, others give the national cooperative unions the right to formulate their own rules which sust then be officially approved.

Almost universally, any group of people seeking to form a cooperative rust tirst adopt by-laws, the objectives of which g clearly defined, and submit them for official government approx

The law generally defines the conditions and obligations under which members may enter and leave cooperatives. A mining-number of members is susually required before a co-op can be registered. The minimum may vary from 7 to 20. Almost all the laws state that members he above a certain age (usually 18). Sometimes membership can be limited to those living in the same village, same occupation, etc.

The law provides that the capital of the society shall be variable. If additional members seek admission, new Ameros will be issued. Members are usually free to leave under the law although is some cases they any be required to give notice, be sometimes members are legally problematic period of time, etc. Sometimes members are legally problematic provided in the course in cooperative forced to tink land use.

The law generally specifies how a cooperative is governed, Most countries' laws state that the highest authority is the general annual meeting. Each member has only one vote, some forbid voting by proxy and by mail. Some laws even detail the w. in which meetings are held.

The law defines how the cooperative is to be financed. Usually there are two alternatives. One is that the cooperative may have no share capital. The members are justify and severally labely extraorded the cooperative may contract. The other alternative is that members are cooperative may contract. The other alternative is that members in the cooperative may contract. The other alternative is that members alternative is that members dependently of the share or perhaps and their labelity of the cooperative may be considered to the value of the shares or perhaps and the collective that the collective the value of the share. It is widely members of a society by unlasted liability will promote a greate sense of responsibility.

where a comp is financed by shares, the rules must state the value of the shares, and initiates and maximum number which members may hold. The minimum is uniformly the same for all members. The purpose of setting assisting is to prevent any one purson trom having too large an interest. Some laws pormit the

Laws vary on whether a cooperative must do business only with members and if members must do business only with their cooperative.

Some laws insist on political and religious neutrality while others do not. Mont specify what records must be kept and who has access to them. Almost laws provide for periodical audits and annual reports to be submitted to the government. Some over neighbor on siderable privileges to comporatives.

Common law and contract law are very important to cooperatives. These vary from country to country.

Cooperatives are greatly influenced by property laws. There are two important points to consider when property changes hands by sale or gift, or when the owner dies. First, is the owner entitled to transfer the property? Secondly, has he made his intention to do so perfectly clear to all involved?

Another area of concern for a cooperative is liability for injuries. Like common law, contract law, and property laws, bodily harm liability is not specific for cooperatives, but is nonetheless important.

It is the job of the secretary of the cooperative to know the legal statutes of the country and to see that they are enforced. A good cooperative secretry or manager should work to see that laws and regulations are observed, and contracts examined and implemented.

Admittedly, this paper is only a general outline. Hopefully, it has explained what a cooperative is, and basically explained the procedure of setting up a cooperative. A general idea of financing a cooperative and the laws governing Cooperatives has been given.

One of the most important ideas is the basic premise of a cooperative which states that a cooperative is a self-help organization. The goal of the extension worker should be to make the cooperative a self-sufficient entity so that it will continue to prosper once he/she has left the community.

Peace Corps Volunteers Randall Stern and Anne Wagner authored this section.

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FORESTRY AND COMMUNITY DEVELOPMENT

In many agricultural areas soil fertility has been deplated atter many years of over-ferming and the lack of conservational practices against wind and water erosion. As a result of these improper practices, a snowballing of problems has been created. Production from the fields has forced the farmers to clear forested lenst to make mer fields. Most of the suitable agricultural land has been cleared and put into production and met farmers are clearing areas that are not suited for the suitable and that they will have to move to new areas or ske out an existance on the poor land.

The denudation of the land has led to extensive soil erosion and heavy sedimentation of the streams and rivers which in turn has led to a lowering of the water table. A shortage of forage and grazing areas for livestock has also resulted from the lack of production in the fight.

One possible solution for this problem could be the following plan: Participants in this project would include a group of farmers and the younger members of their families. vounger members must be involved from the start if they are expected to carry on the project in the future. If in the community women have the responsibility of collecting forage for the livestock, they also should be included in the planning of the project since they will be the ones who will have to go cut and collect the forage. In many cases women in the community are the experts on firewood and therefore should be included in choosing the species. The community developers' role would be to help set up and design the project. Once the project is going he/she woulremain to give technical assistance and support. Part of the technical assistance would be to help establish either a communit nursery or individual nurseries. If a community nursery is made, the community developer must train someone to run the nursery.

Goals for the project must be reached through group participation so that all parties involved feel they have something invested in the project and will dedicate themselves to it. Goals should be divided into immediate and long term goals. Paily possible goals could be:

immediate: Raising the productivity of the land by proper land management practices and incorporating soil conservation practices. An additional result would be the slowing down of deforestation trends.

Long range

The establishment of a permanent firewood supply, providing a supplementary of forage supply for livestock, creating a source of timber.

In setting out to reach these goals a multipurpose program must be established leaving room for expansion and changes. Also, all possible risks and each participant's role in the project must be clearly understood before the activities commence.

PARTICIPANTS

A key concept of forestry for local community development is the participation of all segments of the community, especially those groups whose role in the community is often invisible or lupored. This project promotes the participation of women in the community to help meet the needs for alternative sources of income. One reason for this is that weeks nare most likely to have income. One reason for this is that weeks nare most likely to have feel more of a need to earn additional income since they rarely have the opportunity to work outside the home and to be paid for such activities. Although the project may begin with a group of young housewives or terange women, activities should eventually should excite how members would experience when the paid and what the responsibilities of participants would be.

GUALS

In this plan the creation of alternate sources of income for project participants is the most important short-term goal. To evaluate if this goal is being achieved, participants need to examine whether the profit they earn sakes the effort they put as a special to the property of the property of the property of the put appreciable difference in their economic situation, and whether the money that they earn is available when it is most needed.

The long-range goals are concerned with the desired impacts the project would have on the community. Several of these might be:

- initiation of other projects in the community that provide alternative sources of income,
- increased appreciation and utilization of local resources,
- identification of women's activities as a stabilizing factor for the community,
- o increased awareness of trees, especially indigenous forest species, as beneficial to the community,
- o establishment of local nurseries that can supply fruit
- trees, ornamentals, and other tree species that can be utilized in community projects.

DESCRIPTION OF PROJECT:

The basis of this plan is the development of existing skills and practices for the participants. The first step would be the investigation of those activities in which women are involved and which could be developed to generate income. This example uses the processing of fruits to make marmalades and jams.

It would be necessary to know which fruits are locally used, when they are available, and how their sources are distributed

The tirst step in reversing the deforestation process is the need to re-establish the fertility of the soil and eliminate the need to make new fields. This could be accomplished by incorporating green namers come into a corp rotation plan. Also, by planting certain legarithe species, which have good nitroges fixing characteristics curvas de nivel", the pruning of these species could be accomplished by the process of the species could be accomplished by the process of the species could be accomplished by the species of the species could be accomplished by the species of the species could be accomplished by the species of the species of the species could be accomplished by the species of t

However, if this is to be a successful project, it must be fully understood by the farmers that the green manure crops have to be turned over and incorporated into the soil before they fruit to serve as a fertilizer. It could be difficult to convince then to "throw away" a crop.

In order to slow down wind and water erosion there are a variety of solutions. To eliminate such of the problem of wind erosion, wind breaks could be established. This could be done by planting a live fence with the trees planted close together. This live fence could be planted with trees that serve nore than one purces, such as fruit trees, forage spaceles or even berry bushes.

To control water erosion the fields must be put into "curvas de nivei" or countour lines. Along the curvas a variety of plants could be planted. Bunch grasses could be planted that serve either as former or for roof that

An agro-forestry plan using a variation of the taungya system by planting multi-purpose tree species (ones that are good for firewood, lumber and torage) could also he incorporated into the curves. If a legues is used it would also fix nitrogen, bither exotic or indigenous species could be used. Midgenous species should be used. Indigenous species notable, because the second of
If the short term goals are reached, the long term goals are only a few year behind. If managed properly, a permanent firewood supply can be established from the trees planted on the "curvan de nivel". If indigenous species are to be used, the women should he however if exotics are used, chowever the control of the both of the second process of the

if multipurpose species are planted they will also create a supplementary torage supply. Fruit trees such as quarva from which cows like to eat the fruit may also be planted. Also incorporated into the crop rotation plan could be a forage grain such as sifaifa which after a few cuttings could be turned into the soil as a oreen manure.

A direct result though not a very visible one in reaching these goals will be the level of the water table, reestablishing the ecological equilibrium and slowing down the migratory movement away from the community.

A result of shifting agriculture is the denudation of the land causing heavy soil torsion which eventually leads to the lowering of the water table. Water is no longer able to soak into the ground to reach the subterranean streams which feed the local wells. Instead, the water runs off the hills silting up the streams and rivers. The ecological equilibrium has also been disturbed; fish can no longer live in the silted rivers, and animals are being forced deeper into or in some cases out of the forcest locking for food. The food are fined to the forcest locking for food the food are fined to the forcest locking for the food the food are fined foods. People are migrating from these older areas where the land has been depleted and the forests destroyed to never settled areas.

An engoing evaluation of the project should be carried out, A committee comprised of farmers, women and members of the younge generation can evaluate whether crop production is being increased and if so, is the amount of increase making these practices profitable. However, it must be kept in mind that the increase in firewood and forage must be included in the profits.

PROJECT PLANS: Forestry for Community Development

PROBLEM:

In most agricultural based communities, and especially in colonial areas isolated from larger towns and centers of commerce, the local economy is based and dependent upon the cycles of harvests throughout the year. This cycle is important to the harvests throughout the year. This cycle is important to the necessary maintenance jobs and to prepare his fields for the next season's crops. But since the crops a farmer can raise on his land are often his only source of income, it also creates a season of "no money," or that time when the last harvest's income runs problem for many rural families, one that effects almost all aspects of community life.

The following plan proposes ways in which this problem can be met by the community with the objective of supplying alternative sources of income to members of the project.

within the community. Fruits which are community used are oranges, grapherfuls, guava and various berries. Other fruits, cultivated locally or can be harvested from indigenous torest suecies.

The timing of trult harvests is important and should not interefers with regular harvests or those perions during the year when communities are involved in other established, pre-determine activities. Also important is that the income from the project is available when most needed. It only a few individuals cultivate a certain fruit on their land, it may be preferable to choose the fruit of a compon horsest empode which would be available to all, even of the control
Atter discussing these aspects, participants should also consider which fruits they enjoy working with most, which would be used most in their house, and which would yield the highest quality and variety of products.

any community worker could be of assistance in the investigative phase of this project. He could also mistribute the results of the investigation and present the project to the community. It would be important for him to present this project to the state of the could be involved or who may affect the success of the success of the could be involved or who may affect the success of the success of the could be involved or who may affect the success of the could be involved or the cativities of the state of the products. After interested members have understond and accepted their responsibilities as participants, the development worker with several participants ould initiate the plan by giving storage, bytienc are participant could initiate the plan by giving storage, bytienc are participant could initiate the plan by giving storage, bytienc are participant could initiate the plan by giving storage, bytienc are participant could initiate the plan by giving storage, bytienc are participant could initiate the plan by giving storage, bytienc and the conserve properly their products.

START UP MAINTENANCE:

The site for group activities could be tound within the community: the local school, a social senter or a home of one of the participants. The individual activities could take place in the member's home. Hany options exist, however, such as madil groups working together in homes or using a community kitchen such as in a school.

Each participant would produce japs and preserves trome truits with which she has chosen to work and which is available on her land. Another alternative would be for the group to huy truits at hulk rate to supply to all members. This option may be honeficial when certain measured fruits are very chong in local markets.

Although the actual production of the jams should be simple, there are several points that, especially in the beginning of the project, should be carefully observed:

 production should begin with a few jams which are known to be widely accepted and relatively simple to make. Even though they may not generate the most profit, their simplicity allows for the most certain, immediato success of the project. The project could be expanded later, after it is well-established, to include other trust products that would sell for higher prices.

- some queta should be set for the minimum amounts of jar produced by mach rember within a certain period. For example, the quota for a one-month period may he five quarts of crange narmalade and tive quarts of quava para. These quotas should be based on the minimum amount of products needed at a given season to make great and matketing profited and matketing profited and the participation in the project is worthwhile.
- a committee should be responsible for quality-control, examining the products according to standards they have designed, and using only suitable products for sale.

BENEFIT DISTRIBUTION PLAN:

The marketing of these jams would be the next important stage of this project. A collection site should be chosen where participants could caliver their finished products to be stored until they are marketed. At this point participants could receive credit for the value of the products they have contributed and would realize their profit after marketing.

A different committee could be responsible for maintaining this collection site (posibly a member's home), keeping records of products contributed by each member, delivering products to chosen markets (possibly local shops, large town markets, or an individual buyer), and distributing profits to members after salu. The group may choose to save a percentage of the profits for future supplies needed, or individuals may buy needed supplies tron personal profits.

The role of the community worker during these stages should be one of technical advice and support, perhaps helping with problems in the jam production, giving ideas for different ways and places to market the products, or giving davice on caring for the truit trees and planting new varieties. The managerial during should be in the homes or nelected committees within the group.

Cher members of the community may eventually become involved in the maintenance of this project as it expands. The men in the community may be able to supply the firstood which is marketing the products, sechool children could be evalved in harvesting truits and a local nursery could be contacted as supplier of fruit tree secolings so that new trees and new truit varieties could be obtained by participants. If there is no local nursery, some groups may cooperate with the project by meditings. In this way the project involves many sugments of the community and its benefits are distributed widely.

EVALUATION PLAN:

The time for the project could initially be one year, or possibly one meason, from fruit harvest to aciling the primiers. This allows potential for program flexibility by evaluating the success or problems of the project after one smanne of operation. Changes can be initiated to reach moster the yeals of the proper, the media of the project after the proper of the processing the project and the project and the processing the project and the project and the processing the project and the pr

By looking at the innurange implication of a jirjuct such as this, we see how community-newelogiven needs can be not my torestry, in this case through the cultivation of fruit trees are the utilization of their products. On the other hand, the goals of torestry projects can be successfully set my working through a community development approach. The establishment of corvanily and the successful is a simple projects an example of the control of the successful in the control of the successful in the chances for success in future projects and thereby increases the chances for success in

SHORT AND LONG RANGE GUALS:

Goals of the project should come out of the needs and wants of the community. They should be well defined and clearly reflect the nesires of the community to create good quality participation. The goals are as follows:

- students will learn about nutrition and how a balanced diet is needed to remain healthy.
 within a relatively short period of time, the garden will
- be producing a continuous supply of fruits and vegetables that will help provide a better diet.
- the students in the school would be receiving environmental education from working and observing the gatten.
- this project will hopefully serve as a model for designing future projects dealing with other community needs.

OTHER LONG RANGE GOALS:

- o The school yarden plot would help educate the total community about health and gardening.
- With this new awareness tamilies would begin their own gardens.
- As truits and vegetables become note common in the community, the nutrition and health levels will rise.
- The one or two seedbeds of tree and shrub species nay oncourage the planning of a separate tree nursery.
- o Trees and shrubs would be available for the students to

- plant at home, in the schoolyard, or around the community.
- Trees and shrubs could be grown to promote the "week of the tree" activities.
- Trees, shrubs, truits and vegetables could be soid to buy more seeds and tools.
- When fruit trees mature, extra vitamins could be added to the diet of the community.
- o "ree species planted to provide forage for livestock would help improve the quality of livestock raised.
- O Trees could be used to begin agro-torestry projects.
- Shruhs could one day be used as live fences, replacing the old.
- O The experience of students working together for a cormon goal will possibly improve their ability to work effectively with the community in the future as adults.
- Also, community projects will help develop close fies within the comunity which may encourage young adults to remain, when so many migrate to the cities.

WALUATION PLANS

Methods of evaluating the project should be incorporated to the project easium. A system of zeedback from project and the proj

Community developers possess many skills which can be ansmitted to developing communities. The key to this approach the answoring of these needs by using the resource already wilable but perhaps not realized.

The above project plans have been presented as examples of w forestry can be used to meet basic human needs. This is a new meet, with a new name; to estry for local community cevelopment (pl). *LEO projects approach to exetty related problem. In the size a top-down, large school to extery related problem. In the size a top-down, large school to extend the projects. In the size a top-down, large school individuals for no nutside the community size of the size

FLCD has given a new meaning to the word "forestry" to encompass anything from picking fruits and canning them to integrating agriculture with forestry. This is done to meet the needs of the community.

In the examples presented, the consumity needs were net through their own eftorts. The community identified potential problems and through torest. The community identified potential problems and through torestry sought viable solutions. Each project illustrates haw all segments of the community users in a large through as women involved, including such requestly ignored groups as women the country, community-oriented projects are unique to a night intensity country, community-oriented projects are unique to an indivinual setting. Problem solving techniques should take into consideration sections. The end result should he the unique to a set in the constant of the community orients and sustained benefits to the community building of self reliance and sustained benefits to the community

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The tollowing Peace Corps Volunteers contribute to this exercise:
Karen Dillman, Jacob Fillion, Terry Simeone, Kama Sterrett.

FOREST PRODUCTS OTHER THAN TIMBER

The world's lorests are being reduced drastically every year because of the need for timber, firewood and clearing for agricultural purposes. This has negative affects on the ecological halance of nature. A tree is more than a strenhouse of tampible affects on the second of tampible affects of the second of t

In order for NPF to be neveloped attectively it is essential that the extensionist reach the campesino at the community level. To the campesino, NPF means (1) better land use through aquaculture-agriculture, silvipasture or combinations of hoth, (2) greater economic stability through full fleeged reap of plant anatomy (3) continuation of traditional and cultural uses i.e., herbal medicines. Various products of this multi-use system oils, syrups, 2) tood tor animal consumption such as forder, fruits, seeds, 3) commercial products such as medicines, art, rubber, oils, dyes, rope, resin (tannin). By-products include silk, honey, whichilfe (game meat), mushrooms, fish, and ferrilisers. Other important uses include windbroaks and shame.

Some specific examples of product forestry are:

Acacia albida retains its leaves through the dry season and sheds them just as the rainy season begins. This has a number of economic benefits: a) forage is available throughout the dry season when other trees are leatless; h) at the end of the dry souson, when feed is often desperately scarce, the protein-rich pods are naturing and drop off in huge quantities; c) during the hot months the trees' dense foliage provides cool shade for livestock; d) the trees leafy crown protects the soil when most urasses have succumbed to drought, leaving the ground vulnerable to wind erosion; e) the leaf mulch and continuous presence of livestock near the trees greatly enrich the soil, making it more suitable for growing crops among scattered trees: f) the trees' toliage talls off just when tood crops are being planted, perfectly timed for providing soil nutrients when they are most needed; (1) the trees lack of leaves during the rainy season anables sunlight to reach crops planted around it.

other advantages of this tree include drought resistance and existence of Sibme to Sibme of rain per year. The seeds can he dried and used later for easier planting, unlike other acacia pods, which split apert and nisintergrate when stored. The spreading root system provides excellent protection of soil. Although this tree is indipenous to Africa, this is a near per example of agon-slive pasture, and research is being done to dovelop it elsewbere.

Leucaena leucocephala is indigenous to Central Ameri orfers one of the widest assortments of uses in tropical le This tree fixes nitroges into soil, provides nutritious toraye and rich organic fertilizer, as well as firewood. Its diverse unrea incluse reforestation of eroded Billsides, windbreaks and shade. A leucane patture is almost 2m high, which gives it an added a summary of the state of the stat

The leaves which are similar to sitsife in digentibility, protein content and nutritional value, are particularly polatchit to delay cows, beef cows, water buffaloen and geets. However, to delay cows, beef cows, water buffaloen and geets. However, comprises 5s of the protein of the leatlest, it causes cattle to produce less than normal quantities of troops of the country of the protein of the leatlest, it causes cattle to produce less than normal quantities of the constant of the leatlest of the produce of the constant o

Tamarindua indica is indigenous to the dry savannas of Africa. 250,000 tons are harvested annually, of which 3,000 tons are exported to Europe and North America. Its pulpy sweet and sour pods are used for most sauces and beverages. The tanarind has an attractive commercial future for producing drinks, jams and confections on an industrial scale. The tree is very adaptable to dry savanna and monsoon regions as long as both have well drained soils. Because of its versatility, the tamarind deserves greater research with special attention to extensive, organized plantings. The tree is drought-resistent and frequently seen in sandy soils near the seashore. It tolerates widely different soils and is known as the "hurricane-resistant" tree because its supple branches are stabilized during strong winds. About half the pod weight consists of both sugars and organic acids such as citric, tartaric, acetic and ascorbic (vitanin C). The pulp is a rich source of vitamins and important minerals and contains more calcium than most fruits. Average annual yield from an acult is very large, 150 - 200 kg of fruit per tree or about 12 - 16 tons/ha. The pulp is often caten fresh, directly from the pod. It is also used to season many foods, for example chutney, curries, preserves, confections, ice cream and syrups. Also, pulp is used in worcestershire and barbecue sauces. Although the pulp is by far the most important product of the tamarind tree, the tree is also used for other products, since young leaves, pods and tlowers are edible. The flowers can be an important source of honey. Seeds are used for livestock teed. Tamarind is also used tor textile purposes and seeds yield an amber-colored oil suitable for foods and industrial use. Tamarind is also valuable for

fuelwood. Tamerind charcoal is such high quality that it has been used for making oun powder and was a major fuel for producing day (gascyen) during world whar II. Tamerind is easy to propagate had direct seeding or by transplanting. Its seeds remain viable for months and germinate rapidly.

Mangroves are found throughout the tropics and subtropics of the world in shallow water and muddy tidal flats. Conditions most favorable for mangrove development are found in quiet bays, into which rivers flow gently. Its uses include charcoal for fuel, Coastal protection from typhoon and storm damage through building and binding sand, and soil which effect their own repairs through self-regeneration. Extractions such as tannin are used to produce hard leather tor shoe soles and resins are used in bonding >lywood. Pulp is used for rayon manufacturing and food and 'ildlite production. Manyrove swamps are "the cradle of life," reating the spawning and nursery grounds for many species of fish s well as shrimps, crabs, clams, oysters and crocodiles. They re feeding and nesting grounds for many sea birds and provide Ome to other wildlife. Thus, many people indirectly draw their ivelihood trom mangroves. Mangrove areas are potential resources Or aquaculture. Flooded swamp areas have the capacity to yield O times as much per unit area as the Atlantic Ocean.

In conclusion, any new forestry project introduced 1 necontry must be tailored to meet the needs of the local, rural promunity. In doing this, a convenient programming tool is to coup comparable systems together. The main categories are: nall scale forestry (village woodlots), agri-silvi-culture, robriculture (tree faranny), silvo-pastoral and multi-product prestry. All systems yield products that can either be directly promuned one seally harvested and marketed by the local community, leading the cological belance to the land.

PORESTRY EXTENSION AND DEVELOPING NATIONS

Porestry extension is the science and art of transforring knowledge from research and experience to the practical use of the people. Forestry extension is a science from the standpoint that it requires nethods of research and investigation; and an uncerstanding of the Desic principles of forestry. It is an art from the standpoint that the dissemination of this information requires a definite personality, style and technique; and an understanding of the science of the property of the proper

The process of dissemination can be seen as a bridge which links the existing body of knowledge of forestry to the public.

Selecting the right bridge or method of dissemination is critical. The method must match the means and resources of the community. To stretch the analogy of a bridge still further, it your bridge is not well secured on both ends, it will not support your program. As Peace Corps volunteers in developing nations, you may find it hard even to see both ends of the bridge, let alone make them secure. Indeed, it is obvious that sound forestry applications and practices have not yet "bridged" the gap to the developing nations as deforestation and poor land management practices continue at an alarming rate. Well then, how can we as PCVs build sound bridges to cross to the other side? What follows is a type of manual to be used in building your bridge. We have not supplied you with any parts or blueprints because each bridge has to be built differently, just as all situations are different. The construction is up to you as an individual, but we have supplied you with what we believe to be the most important element in bridge building: IDEAS. Use what follows as may be appropriate. Happy bridge building!

Resources for Extension

The most valuable resource for extension work is yourself. Your educational background, your variety of work experiences, and your broad base of knowledge from reading is something for which many volunteers do not give themselves credit. The ability to about the property of the propert

You can improve your resourceful value through research. There is a variety of printed materials available through various agencies both national and international. Books, regazines, and newsletter publications are available, although you may have to search them out by getting on mailing lists and requesting unbackgions through you local agency or Peace Corps pringen. Also you can exchange materials with other people in your field. This ratural also needs to be made available to your extensions staff and the composinos. A good project is to translate technical works into sample peoplets and posters for distribution in the community, use the resources available and be a resource vourself.

Extension Methods

There are many vehicles available to an extensionist, buth person needs to try out different ways and choose the once which are best suited for the situation according to resources available and personal style. We innovative in trying new Mays, keep variety in your presentations, and share successful teaching tools with others in the field.

Examples or effective techniques include slide show presentations, public demonstrations, plving classes in the Community and schools, signs and posters, showing rowies, Gemonstration plots with labels, newspaper articles and other written information, and personal contacts with individuals in their fields. There are note.

The level of effectiveness rises with concrete demonstrations. Seung is helivering, doing in Learning, "firings" or cooperative projects are more likely to be seven and frusted. To effect a change, the value must be made clear. highestic the concrete-tinancial-benefits for planting. Show multiple use of a windbreak to fireword, shelter, tuture plos, as well as reprise control, included in your training resources should be a variety expanding control.

Using the Formal School Systems

The key to the future is education of the youth. The school system consider the extensionist to reach the next generation of landowners in an atmosphere of learning. Conetally school kids are curious and eager to learn, and you will reap rewards from those children with whom you work.

First steps of contect need to be with the school administration or through a teacher. Nost will be open to your proposals of classroom help or with projects of school wordlots, vivores, or yardens. You will need to start out by huiding a base of trust and cooperation with your counterpart teacher and nurture that relationship to ensure future teaching opportunities.

You do not have to be a trained school teacher to conduct basic classes in conservation and forestry. Using your best extension techniques, keep them scaled to the learning loval of the class. Remember, next school teaching situations are more formal in class and work closely with the teacher. Prepare leand class in triplicate - one for your cooperative teacher, one for your records, and one to share with other volunteers through your Peace Corps program.

Invest in the future by teaching. Help increase awareness and understanding at the grass roots level in schools. It will be rewarding for you and the national goals in conservation and forestry.

Informal Teaching Situations

As an extensionist, you must learn to be open and take advantage of informal teaching situations. Hamy of your best opportunities will occur spontaneously when you least expect them to the extension of the state o

Personal Contact

Personal contact is vital to forestry extension. Renember, you are someone new and different and you must let people uget to know and understand just who you are. The best way to do this is to talk personally with as many people as possible. Communication is alreat totally word of mouth in developing nations, unlike the U.S. where we depend on herepapers, books, TV and radio. Also it takes the time and effort to talk personally with individuals. Teach them through personal contact when prectical and possible.

Confusion Extension

As an extension agent you must make a major effort not only to advise the community of how to inprove its forestry and agricultural techniques, but to explain why there are probleme, now they develop, and how they impact on things living in the environment. These concepts can be extremely complex to explain. An important rule to remember is "keep inlings simple." Explain an important rule to the stiller of the stiller simple concepts examples. The keep a logical progression, expending when you are sure the ground work has been laid.

For example, the loss of nutrients occurs both when topsoil as lost through erosion and when crops use up the nutrients as they grow. Therefore, soil fertility can be maintained by erosion control, crop rotation, use of N-fixing plants, and fertilizing. Each one of those needs to be broken down into separate lensons, such as separate demonstrations regarding different types of erosion control measures. The lovel of frustration decreases with the level of simplicity. Do not be an agent of confusion.

Qualities of the Forestry Extensionist

- o Creates his/her message with community in mind.
- o Plexible enough to take advantage of spontaneous
- Opportunities to advance forestry extension.
- o Is dedicated to the community and forestry profession.

 o Keens his/her message simple, clear and to the point.
- O Uses resources available in the community.
- Provides for continuation of forestry extension after he/she leaves.
- O Continues self-education in the field.
- Seeks the advice of members of the community.
- O Is an available and easily accessible resource to the community.
- O Creates tree time for his/her mental health.

Peace Corps Volunteers Mark Jackson and Hill Stenett prepared this article.

I. Proposal for Native Forest Woodlot Management

Throughout tropical America, mative forests are disappearing at an alarming rate. Torquical America is said to contain approximately 590,000,000 inectares of closed fropical forces, well approximately 590,000,000 inectares of closed fropical forces, well remove continuous, up to 307,000,000 inectares of this forcest could possibly be lost to deforestation by the year 2,000. In Paraguay alone, an estimated 200,000 inectares of the year 2,000. In Paraguay alone, an estimated 200,000 inectares of primary subtropical for paraguay, which contain some of the world's note valuable timber species, are expected to disappear, except in isolated patches before 1993. That same threat lies over the constain forests of America Chamber 200,000 in the contain forests of America Chamber 200,000 in the contain forests of the contain

So, here we are in 1981. What, as land conservationists working in these tropical/subtropical areas, are we able to do to stem the proverbial rising tide of deforestation? First of all we must realize that in many areas deforestation is a necessary evil needed to convert forest lands to agricultural purposes for many of the world's landless population. Many tropical and subtropical areas have demonstrated that with proper soil mangement practices (i.e., agrosilviculture, contour plowing), they are able to support sustained vield crops. The problem begins when marginal lands (those lying on steep slopes or along rivers and streams), or areas in the humid tropics which receive more than 3,000mm of annual raintall, (e.g., Napo River area, Ecuador), are cleared of the natural forest and converted to monocultural situations. These areas quickly prove to be susceptible to an acceleration of soil compaction and erosion leading to abandonment of sites within a tew years.

Let us examine the situation of the watershed of the Panara River along the Paraguayan/Brazilian/Argentinian border as a case in point. This is an area of roughly 5,000 square kilometers which has recently come under heavy colonization pressure. The Panama River Valley is said to contain the richest hardwood forest in the western hemisphere in terms of value per hectare of standing timber. The forests are rapidly being felled with the principle conversion being to agriculture. This use is not sustainable unless strict soil conservation and management is practiced. Destruction of the mixed hardwood forest is causing a negative ecological impact. The soils are agricultural in nature, - alluvial, deep and well drained. However, total removal of forest cover on steep slopes or along critical watersheds leads to wind, water and solar erosion, heavy siltation of rivers and streams and a dramatic drop in the water table. It has been estimated that conversion of the area to agriculture, while leaving 30 - 50% of the forest intact, would probably alleviate many of these problems. In many areas primary and secondary forests still exist on steep slopes and along waterways. This is usually the case on small landholdings between 5 - 30 hectares, where campesino owners have left these remnant patches until available time, labor and money allow for these areas to also be converted to agricultural use. It is with these "marginal" lands

still remaining in the forest that Peace Corps volunteers, working in land conservation, could concentrate their efforts. By offering the campesino landowner a forest land use plan for the management of his woodlands as a woodlot or "Arboleds", thousands Conversion. These scatterings or remnant forests could constitute a significant proportion of Paraguay's future forest reserve.

It is recognized that many problems arise in the promotion of long-term land use plans to campesinos whose vision usually does not extend past the next planting season. These difficulties can be overcome by appealing to the campesino on an intellectual level, oftering him genuine "facts" on the long range economic value of woodlot management along with the immediate returns and benefits to be realized year round, i.e.; continual source of firewood and lumber for personal use. Then compare woodlot use to other land uses. On a personal level discuss the future security of sons and daughters or even his own old age security. Portunately, economics will, in the long run, be the ultimate promoter of the value of woodlot management; as the scarcity of first class wood grows, the value of residual stands increases. The Paraguayan nigh forest can be managed in 30 year rotations producing as much as 115m3/hectares of high grade timber each rotation. Therefore, the management of indigenous forestlands should be viewed as a viable and legitimate land use.

The campesino who spends half his life beating back the forests so that he can plant his crops, traditionally thinks of the torest as an enewy, when he sees forested land, he seem land that is helm "wested" or "not used", land that is upproductive and should be seen that the control of the control of the land of the land of the control of the control of the land of the land of the control of the control of the symbol of progress. Here the volunteer conservationist has the opportunity to teach the benefits and sconnoir value of woodlor henagement. If forest land one, it vouls to the control of the co

The objective of this paper is to arm the volunteer with the theory and practice of native forest management in the tropics, so that he or she can carry these ideas to the campo and promote them. Many of the silvicultural techniques used in managing an ecosystem as complex and dynamic as the neotropical forest are still poorly understood and yet untried. But in the case of Paraquay, as well as many other Latin American countries, where the time for promoting forest land conservation and management is limited to just the next couple of years, the time to start is now. Time is too short to wait until stand increment and individual species growth studies are concluded and published. Enough information is available in most tropical countries to be applied in a sound management scheme. The important consider, is that eventual impact on the land will be positive and not negative, because management should do nothing but improve fo land productivity in the long run. Because we are working in cases, with rotations of 25 - 40 years, there is much time to improve management techniques or practice. Therefore, it is

litle importance that our silviculture is foolproof from the beginning. What is important is that the campesino landowner recognizes the importance of woodlot management and sets aside land (marginal or otherwise) for an "Arboleda."

II. A Woodlot Management Scheme

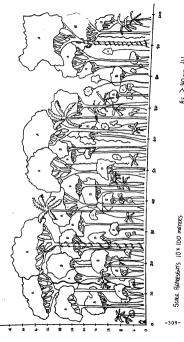
As most cropical ecologists know managing an ecosystem as dynamic and complex as the meotropical forest can be a difficult and frustrating experience. Trying to manage these forests on a sustained yield basis can be evem more so. Presented here is a management program developed for a Paraguayan subtropical humbforest woodlot. It amy be that it cannot be applied in all of forest woodlot. It amy be that it cannot be applied in all of programs as a guideline for possible ideas for application where management old namight be needed and utilized.

The Theory of Tropical Forest Management

The theory of this management plan is based on the proposition that a tree like "Lapscho" (Tabebuis ipp 1 from the time of germination in the natural forcest needs nore than 100 rounds based (this is the thin american continuous continuous that the continuous cont

When looking at a forest profile we can identify 3 diameter classes in a natural stand:

- the dominante and co-dominant trees of the 40 cm and larger trees,
- the juvenile and standard size trees of the 10 40 cm class,
- 3) the seedlings and saplings of the 0 10 cm class.



B= 10 to 40cm dbh A=>40cm dbh

(Fig. 66)

C= 410 cm dbh

SugTROPICAL Huming FAREST. ITAPLIA PAREZLAN IDEACIZEO PROFILE SHOWING THE DIAMETER CLASSES.

since we can see that the natural forest is a dynamic, over growing system, we realize that it we were to remove the largest trees in the lorest (all the trees of the greater than 40 cm class) the two smaller disasses would remain to recover largest the second of the second control of

When discussing woodlot management with the campesing landowner not too much emphasis should be placed on these harvests every 30 years. The more immediate benefits should be highlight-For example, one hectare of managed woodlot is able to provide a continual annual source of firewood to a family or community using only the dead standing or sound fallen trees without ever cutting a live tree. Lumber for house building or other construction projects could be obtained from a campesino's own private woodlot, and it would not be necessary to call upon expensive outside resources for materials. Other products to be realized are tool handles, fence posts, fruits, orchids, latex, medicinal plants and drug extracts, game animals and parrots. All are renewable within a reasonable period of time after conservative harvesting, by cultivation of the forest the production of many of these living things can be substantially increased. The establishment of plantations of Palmito (Enterpe equlis) in the forest understory is a good example. Palmito occurs naturally in the forest understory. The terminal portion of it's growing stem is used as a food condiment and is considered a delicacy. As many as 100 plants/ hectare could be planted in a woodlot, integrated with tree enrichment plantings, and harvested after 15 years of urowth.

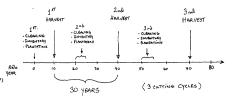
Lastly, with the rapid rate of deforestation the value of a harvest each 30 years will increase the importance of some of the world's most valuable hardwoods.

It has been estimated that the natural forest can support from 100 to 150 large trees of the greater than 40 cm class per hectare. Rarely is this density of stocking found in the natural forest due to computation from a variety of weed trees, herbacious forest due to computation from a variety of weed trees, herbacious management program is to eliminate competing species and to maintain optimus stocking of valuable thimber in each dismeter class. The forest manager should try and maintain the stocking of the leas than 10 cm class at 100 splings/metcare and of the 10 section of the 10 cm class at lasts 150 juvenile trees/hectars. This vill answer harvested each 30 veers turn each hockers. Use class will be

The forest management program is divided into 4 parts:

 the clearing of the forest understory ("Limpieaz del Norte")

- the forest inventory,
 the enrichment plantings,
- 4. the selective harvest.
- A time-line of these steps might appear as such:



The tirst 3 steps, the clearing of the forest understory, the forest inventory and the enrichment plantations are usually employed together. In this way the inventory and the plantings replayed together, in this way the inventory and the plantings result in the planting that the planting is the planting that the planting is the planting that the planting is the planting that the planting

Before beginning the tirst steps of the management program the location of each managed hectare (or managed 'unit' if areas less than one hectare are used) in the woodlot should be well established and marked with painted posts in each corner. A crude map will facilitate future record keeping of inventories and planning or scheduling of future harvests. A 10 meter butfer strip of natural (uncleared) forest should be left on the outside boundaries of the woodlot. The advantages of this practice are

- to protect the cleared area from strong winds,
- 2. to form a natural fence against livestock entrance,
- to maintain shade within the closed canopy to prevent the entrance of sunlight that would stimulate new weed growth within the cleared srea.

The Forest Clearing

The clearing of the forest understory of unwanted vegetation is the first step in the management program. A clearing involves the elimination of all species of shruhs, herbacious plants and lianas (Byphyte climbus) that have no value as wood materials, firewood, or medicinal or edible plants. This unwanted vegetation computes with the regeneration of valuable wood species and suppresent their development. The clearing will also stimulate may resementation of treas and urowth of released specificans.

There are, principally, 5 to 10 species of plants that form 90% of the thick growth in the forest understory. In trying to identify the seedlings of the various valuable wood species (some 300 of them), it is more practical to learn to recognize the 5 to 10 "weed" species that you want to eliminate. Another reason for utilizing this approach is that inexperienced campesinos can be quickly trained to identify these few weed species for removal when learning to employ forest clearings in their woodlots. has been determined that between 85 to 110 work hours (or 3 persons working 24 days) are needed to learn well one hectare. This estimate depends on the thickness of growth in the forest understory and the level of experience of the workers. The clearing should open up much area of oreater solar penetration, stimulating new vegetation and also giving growth opportunity to supressed seedlings to grow above competition. If the clearing is well done it needs only to be applied once every cutting cycle (every 30 years). This is because the function of the clearing is not to be "maintained" but only to provide the initial stimulus for regeneration and regease. After a forest is harvested, with the largest trees being removed (all these within the greater than 40 cm class), there is usually a period of thick vegetative growth in the forest understory stimulated by the opening of the canopy. Within 5 to 15 years the middle class should have grown to dominante position and begun to again shade the understory strata, supressing the thick growth of weed species. At this point (10 - 15 years after harvest) another clearing should be applied to eliminate weed competition and stimulate new tree growth. Thus, the sustained cutting would start over again (see time-line diagram).

The Inventory

After tinishing the clearing of the format understory you will have cany access to the remaining trees, making this the ineal time to take stock or inventory of what type of trees are ineide your woodlict. An inventory will trell you the quality of inventory (all the trees larger than I neter in height are counter) should be able to finish one hockers in less than 2 hours. One person identifying and measuring the diameters and the other person noting the date on an inventory sheet, make the most efficient team. Demyth of the tree that is the continued and the continued are continued to the continued the continued the continued that the continued the confidence is the continued that the contin

A simplified inventory sheet could be used with campesinos to record only the number of trees of each species in each diameter class.

Hectare #1

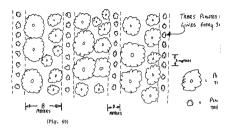
SPECIES	LIDem dbh	10-40cm dbh	> 40cm dbh
CEDRO	90	13	13
LAPACHO	_	_	2
Guatamaú	113	18	9
LAUREL	******	5	8
ig. 68) ToTAL	203	36	32

This is the easiest system and it gives the campesino owner a good idea of the quality of growing stock he has per hectare in each clameter class of his woodlot. During the inventory notes should be taken to indicate forest gaps or other areas where regeneration may or nay not be naturally prosent.

The Enrichment Plantings

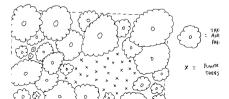
From the inventory, it may become evident that the stocking of the lower diametr classes may be so inansquate that complete stocking at maturity (greater than 100 trees/hectare) will not be achieved, or maybe a specific valuable species does not naturally Equipmentate well and a greater density is desired. In these cames recommended. **Merithemen Plantings** will increase the stocking in the 0-10cm class and up-grade the quality of timber in your woodlot. **Now sethous of enrichment plantings are employed. One

system is the planting of seedlings in systematic rows or lines.
A radius of 1 meter is cleared to the bare soil around each plant to eliminate conjectition.



This system is used when improved stocking is desired, and it assures the even distribution of the plantings throughout the area.

Another system is the planting of individual trees in gaps or large opening minder dense canny where natural regeneration may he lacking. The site situation should determine the species of trees plant (i.e., shade intolerant species planted in forest gaps; shade tolerant species planted in dense shade).

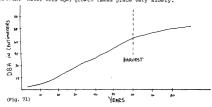


The Selective Harvest

The harvest marks the end of each cutting cycle or management rotation. A "selective" harvest is the removal of all the mature trees of the 40cm class and larger, leaving the 2 smaller disaster classes (less than 10cm and 10-40cm class) to recuperate, grow, and be harvested in the future. It is this way that a forest is managed on a "sustained yield" basis.

"All species harvest" practices are becoming more and more common place in tropical areas as wider uses for second and third class woods are being discovered. One example is the development of the common particle board. They utilization plants for the production of particle board. They utilization plants for the production of the common particle board. They are the particle board of the common particle board. They are the production of greater utilization of wood resources and greater earnings for the Campesino woodlo towner if the forest is managed on a rotational production of the production of th

To understand the theory of a selective harvest, it is first necessary to understand the growth rate of a forest tree during its lifetime. The first 60 years are the years of most vigorous Growth. After this age, growth takes place very slowly.



while a Lapscho tree may need only 60 years to grow to a sixe of 60 or in diameter, to grow another 20 to 80 us in diameter would require another 50 years. It can be seen that after reaching about 60 cm in diameter most trees begin to lose their economic cost effectiveness. Also, once a tree hegins to lose its vigor it also becomes less resistant to insects and disease attacks. An example of bis can be seen in the development of distinct and the seen of the development of distinct of the seen
well managed woodlot.

Careful consideration is important when selecting trees to be marked for harvest at the end of each cycle. The removal of trees before they reach maturity (in most cases trees smaller than 40 cm in diameter but its very species specific) could result in earnings to future harvest. A Kew considerations for the selection action.

- The distinct characteristics of each tree should be considered in each site. For example, a tree of certain characteristics might be removed in one stand, but following the type or condition of the trees of another stand, a tree of the same species might be left to the next harvest.
- The form and condition of the tree is considered. A tree of poor growth form should be removed before maturity. The opening produced will stimulate new growth.
- 3. The species of the tree should also be considered because there are great differences between species growth rates and sizes at maturity. For example, a Tibbo [Enterolchium contorlisi]quum) of 40cm in diameter is still considered a young tree; left to grow for another 3 w years, it would grow to a size of 80 to 90 cm in diameter. But a Lapacho (Tabebula 1pi) of 40 cm in diameter given another 30 years. Therefore, the Lapacho might be harwested at 40 cm in diameter and the Timbo left for another growth cycle.
- A tew large trees of the valuable species with good growth form should be left in the stand to provide a seed source for future natural regeneration.

Following this hasic management program the volunteer conservationist can design a woodlot management plan in a torm which will best meet the needs of the campesino landowner in his area and at the same time be preserving a resource that will become increasingly important each year.

Peace Corps Volunteers Robert and Terry Simsons contributed to this exercise.

EXOTIC VS. INDIGENOUS SPECIES

This issue concerns whether exotic species of trees should be planted in place of indigenous species. Foresters and people around the world are confronted with this question. The decisions made should be based on all available information because they carry long range consequences.

In many countries throughout the world, exotic species are favored over the indigenous species. In some countries, it is an issue over which environmentalists fight as they see the indigenous forests disappearing in favor of exotic species that are more commercially attractive (e.g. Pinus radiata in Australia). Initially, exotic species were transported around the World with the expansion and migration of human populations. Many species were unsuited to their new environments and failed to grow. Others expressed a different phenotype within their new environment. An interesting example of this is Pinus radiata - a species indigenous to Monterey, California. In its indigenous environment, it is a tree of poor form and quality and is considered a non-commercial species. Outside of its indigenous environment, it grows straight and fast in countries such as Australia, New Zealand, and South Africa, and in some countries in Latin America. In these countries, Pinus radiata is an important commercial species. Eucalyptus is another interesting example of the use of exotic trees. Eucalyptus is a genus of trees indigenous to Australia and contains over 500 different species. However, within a relatively short period of time, species of the genus have been planted in countries around the world. At the present, there are more Eucalyptus trees growing outside of Australia than within.

Exotic species are favored over indigenous species for a variety of reasons. Economics is probably the main one. Some exotic species simply grow faster and attain commercial value sooner than the local indicenous species. They may be of superior quality for certain products that the indigenous species are not adapted for (i.e., pulp and paper). In some cases, exotic species are better suited to the site than the indigenous species. This can occur in areas where the indigenous trees have been cleared years aug through poor agricultural practices and over-grazing of the soil has altered it to the point that it will no longer support the indigenous species. Exotic species can be used in these areas for erosion control and for soil rehabilitation. An example of this is the use of equalyptus for the control of desertification in some African countries. The scarcity of tuelwood is a major problem in some parts of the world, and it is metting worse each year with expanding populations. The slow growing indigenous species cannot keep up with the demand for fuelwood. The immediate answer may lie in the establishment of woodlots with fast growing exotic species. Also the establishment of exotic fruit and nut trees could improve the diets of the local people and can open up new markets for a cash crop. On an every day level, throughout the world, exotic trees are used extensively an horticultural species. Many have a high aesthetic value and are tound as shade trees around homes and within cities and parks.

On the negative side, when indigenous forests are cut and replaced with exotic species, the resulting forest is basically a desert with respect to the indigenous flora and fauna. The natural ecology of the area is drastically modified. Not only are the indigenous flora and fauna eliminated but the basic chemical composition of the soil is changed. Another point to consider is that most exotics are planted as monocultures and could fall prey to disease or insect attack.

The decision of whether to plant exotic species vs. indigenous species must be based on the specific site and the existing conditions. The pros and cons must be weighed. What are your objectives and what will the long range effects be?

In Summary - There is no easy answer when it comes to deciding whether to use exotic over indigenous species. The decision made must be based on each specific site. What are your objectives and what will the long range consequences be? The trade-offs associated with your decisions must be carefully weighed.

EXOTICS vs INDIGENOUS - ECUADOR

Equador's coastal region stretches north-south, hordered by the Pacific Cocan to the west and the Andes chain to the mast. The forest types way from tropical to sub-tropical dry. Certain the forest types way from tropical to sub-tropical dry. Certain the most feature and the world. Consequently, the region is very rich both in agriculture and forests. There is an extensive variety of indigenous trees in the coastal area. The indigenous tree was the consequency of the proposes and are very important could be accorded to the consequency of the coastal consequency of the conseque

There are numerous high quality madera buena species. Some if these are Cordia allodora, Laures, Caderal adorate, Cedro; abboula chrysantha, Gusyaium; and Sweltinia sp., Caoba. These procless are prized for furniture, parquet floors, and other for the contract of the co

The varied indigenous trees of the coastal region are a rich tural resource. They provide the costanos with the raw material com which an infinite variety of wood products can be manufactured.

In the weat where conditions are optimum for growth, fast cwing exotic species are sometimes more economically appropriate an indigenous species. In recent years numerous exotic species we been introduced into Ecuador's constal region. <u>Twotons andis</u>, (feech is a high quality socie species that is favored exotic species that is favored executions of the constant of the control
Other exotic species of particular interest are the trees of e family Leguminosae. The trees of this tamily provide a wide inge of services to the environment they inhabit. Legumes are trogen fixers, their presence greatly improves soil fertility. legs trees are extremely swift growers, providing varied wood oducts in a very short time. Legumes are adaptable to a wide ince of site and soil conditions. They reproduce well and are silv cultivated. In addition to this, they are used as mamentals and for shade. Legumes often provide food for animals n the form of leat forage and/or pods), and particular species ovide food for human consumption. Legumes have exceptional commendations for their exploitation in the hospitable wironment of the coast. But the economic benefits exotic secies provide need to be weighed against the possible Aleterious effects of introducing exotic species into a different wironment.

Monoculture plantations are one of the easiest methods of ootic species exploitation. When planting in a monoculture

certain risks are taken. The introduced species brings with it none of the natural productor controls that exists in its indigenous environment. A pure stand of exotics is susceptible to disease and insect infestation. Insects and diseases can rapidly spread through a pure stand causing considerable damage to the species.

The original forest is often destroyed to make way for the monoculture plantation. Destruction of the indigenous forest can have far-reaching and often little uncerstood effects on the local environment. When the indigenous forest is removed the habitat for many plants and animals is removed with it. In the environment of the sub-tropical and tropical forests, plants and animals have specialized niches. If the forest habitat is consistent to the control of the contro

Some exotics are weed species in their natural environment. In a new environment there is potential for unchecked growth, taking over and crowding out ecologically important indigenous species.

Indigenous and excito species both have an important place in Ecuador's coast. The ranifications of indigenous and excito species exploitation on the ecology of the coast needs to be given serious consideration. Before decisions determining species use are made, trade-offs may be necessary for the region's ecology and economy.

EXOTIC vs. INDIGENOUS SPECIES - PARAGUAY

In Paraguay, the forests are being depleted at alarming rates. If these rates continue, it is estimated that within the next fifteen to twenty years, Paraguay will have no indigenous Coreats remaining. Through this accelerated deforestation, the order will encounter problems such as massive soil erosion, wood coarcity will encounter problems such as massive soil erosion, wood coarcity of the watertable.

The Servicio Forestal Nacional (SFN) which was formed nearly ten years ago, is aware of the deforestation but is moving slowly in taking steps towards reforestation. Servicio Forestal Nacional is interested in exotic species which grow rapidly. They have planted approximately 5,000 ha of experimental plantations using three exotic species; Araucaria angustifalia (Kiri'y), Pinus alliottii (Slash Pine), and Pinus taeda (Loblolly Pine), as well as various species of Eucalyptus. The format used to establish these plantations was based on models used in Brazil and Argentina. Both Brazil and Argentina currently have the market as well as the technology necessary for these types of tree species. However, at present there is no market within Paraguay for the products of these plantations and hopefully, they will be exported to Brazil or Argentina. This in turn creates an economic problem. Paraguay, being landlocked, has a rather underdeveloped transporation system. With exhorbitant prices for fuel, the need to transport timber to outside markets is a costly excenditure. Also, the government has passed a law stating that whole logs cannot be exported. To date, this project does not have a very high priority and the plantations have not been efficiently managed. If Paraguay was to build mills for paper or particle board, and carefully manage these plantations, the mature trees could be processed within the country. The plantations then could prove to be valuable. However, without proper management interest, the exotic species that are currently growing will continue to be in poor condition and will have no significant economic value.

On the other hand, the existing indigenous species are very hardy, grow well in their respective sites, and are useful within Paraguay. Neat of the indigenous torest species grow rapidly, lave a high quality wood, and there is a strong parket demand for lave of the parameter of the parameter of the parameter of the turniture, ornametation, etc. Faraguay has the necessary sawnils to reap the economic hematics of indigenous species.

Environmentally, the use of indigenous species in reforestation is a nound nessure. Using species which have existed naturally for years, maintains the vide diversity of indigenous flora and faums. They will also tetain the natural soil seems growing in Perspays for centuries and have achieved a nowanic equilibrium with their environment.

Thus, specifically for Paraguay, future reforestation efforts should concentrate more on the country's existing

indigenous species rather than bringing in exotic species, based on economic and environmental reasons.

Peace Corps Volunteers Peter Gould, Jennifer Alderman, Patrick T. Evans contributed to the articles on Exotic vs. Indigenous Species.

Forestry for Community Development

Assuming that most Peace Corps Porestry volunteers will be working with rural, small-scale farmers and small landowners, the forestry volunteer must be conscious of the specific needs and problems that affect the forest and land use of the Third World.

"Forestry for community development must reflect the needs, problems and aspirations of local people as seen through their eyes. To be truly appropriate its strategy will vary according to community and place".

If the volunteer is to be a catalyst for judicious forest and land management in his or her community, he/she must consider a number of critical factors.

The volunteer can teach simple methods of forest and land nanagement to rural land cowers. In this way, the campesino can determine his own land resources and assess the results of reforestation projects or other remedial measures on his land. Sovest inventory is also necessary if the volunteer or other Covential Covers inventory is also necessary if the volunteer or other sovers inventory is also necessary if the volunteer or other covers inventory is also necessary if the volunteer or other covers inventory is also necessary if the volunteer or other covers inventory is also necessary if the volunteer or other covers inventory is also necessary if the volunteer or other covers inventory is also necessary in the volunteer of t

The volunteer must stress the needs for the complete evaluation of rural lands, so that the campesino can learn to determine what would be the most appropriate uses of his land, relatively simple land evaluation could prevent forested areas from being cleared for livestock grazing or other agricultural activities when the land is inappropriate for those purposes.

The Campesine must learn to consider soil quality and type, topography, land fragility, flora, fsuna, water resources, and local cultural factors, such as sconomic conditions and pressures that the volunteer control of the control

Several factors may affect the volunteer's success at promoting proper land use. Local professionals (land use planners, etc.) must be willing to act as resources to rural camposinos and apply their techniques in tha field. It is important to the second of the second control that land is actually allocated and used appropriately, tocentives are needed initially to stimulate proper land use, most important, and perhaps most difficult is arquiring the acceptance and commitment of the members of the rural community.

lyorestry For Rural Communities. FAO Forestry Department Pg. 8.

The forestry volunteer must stress the importance of protecting and conserving the existing soils and watershed systems which are so cfitical to the livelihood of rural farmers. The campesine must be aware of the need for protective measures against slope erosion, the detrimental effects of wind on coforested or seni-erid areas, and the problems created by stream siltation, resevoir sedimentation, and torrential water flow in steem, negationus areas.

The volunteer should promote soil conservation techniques that can utilize and be combined with the growing of crops and trees and the production of other valuable resources. In this way, the rurel farmer can keep his land under production and protect it at the same time. In semi-arid and arid regions, the PCV can instruct farmers in the construction of shelter belts and other structures that can stabilize sand dumen, which if left unchecked, would inumdate agricultural agrees.

One hectare of tropical forest may contain as many as 100 tree species, but only a small number are now exploited for commercial use. With such a low density of commercial species, there has been very little economic stimulus for sustained management of tropical forest areas.

Thus, it is important for the tropical forestry volunteer to introduce techniques for managing and more efficiently utilizing tropical forest stands. He or she can teach simple criteria for selecting crop trees for exploitation, control reasures for unwanted wegetation, insects, and plant pathogens; principles of seed selection and storage, and methods of reforestation. The camposino must be encouraged to use harvesting techniques that protect remaining trees and enhance forest recementation.

Because many, if not most, rural communities face vary marginal economic situations, it is critical that the volunteer promotes proper management techniques and better utilization of forest resources in order to realize more of the economic potential of the forest. The campesino must be made aware of the value of Pany non-traditional forest species.

If forest resources are to be conserved and/or restored, carefully developed site-specific reforestation plans must be implemented.

The volunteer must be aware that it may not be possible or desirable to restore the original tree and plant species to a given area. It may be more judicious to introduce species that are known to grow rapidly and reliably.

The selected reforestation species must be well suited to the local ecological conditions. Reforestation will fail if the introduced species cannot adapt to the soil, water, climatic or other environmental factors critical to its survival.

The PCV should teach the campesino proper seedling care and other measures necessary to ensure successful retorestation (proper pruning, etc.). Nursery management, seed collection,

storage, and treatment; seedling transport, care and planting techniques are all skills that the volunteer can transfer to the Campesino so that he can independently sustain reforestation on his own land.

The campesino should be encouraged to reforest with trees that serve multi-jurpose. He should be made aware that a reforestation system that not only controls wind and water erosion, but also provides food, animal fodder, fuel, and wood Droducts such as lumber and pulywood is not only desirable, but Possible.

The method of reforestation involves the establishment of tanaged tree plantations of one or more species. Such a system could provice fuel and timber, and relieve the exploitation Tessures on the natural forests in the area. Research has shown hat a successful tropical plantation could supply 4-10 times the mount of usable wood produced in the natural tropical forest. I antations could also be labor-intensive and serve as an economic timulus in high unemployment areas.

Nowewer, the forestry volunteer must examine the situation Pry carefully before he or she proposes a ronoculture plantation Provided the propose and the proposed of the proposed to clearing of a natural forest in acceptance to the proposed on clearing of a natural forest in acceptance to the proposed antation is not recommended because the conversion of a very verse forest to a monoculture could potentially create an could highly susceptible to disease and insect infestation. Only the proposed proposed to the proposed pro

It is especially valuable for the foreatty PCV to teach the Ital Earser methods of conserving the foreatry and land resources sich he has. It is critical that the campesino learns how to cuuce heat losses during firewood burning, as well as methods of ttting waste and tree loss during foreatry and wood-processing verations.

Rural tentiles must be made aware of the inefficiency of sating and cooking, using open fires as corpared to contained sating units. Stowes could be designed much more efficiently and cill remain simple. The Lorens stowe is one example of a ruch refield be heating device that could be built and used by refield be refined by the could be built and used by satemain the could be designed to the could be designed to the could be designed as a fuel hecause a great deal of heat could be discouraged as a fuel hecause a great deal of heat cours in the course of th

The campasino must be encouraged to reduce his waste during inher harvesting. The selective exploitation of only a few pecies frequently leaves residual trees damaged. Nuch wood is asted when the tree limbs and tops are cut off and left to rot in se forest.

The volunteer should be aware that an all-species rather ham selective harvesting could cause deforestation and lead to more traumatic effects on the environment than traditional, selective harvesting. However, if properly managed, a system involving clear cutting, and all-species harvesting, combined with well-managed reforestation, could meet a community's wood needs, while reducing the exploitation pressures on remaining forests.

Because so much wood waste occurs during processing at sawmills, the volunteer must promote the use of improved technologies (where effordable), to reduce wood losses during milling and other wood-processing operations. The use of the entire tree should be encouraged.

By demonstrating better transport and storage methods for rough logs and lumber, the FCV can show the campesino how he can cut his losses due to mold, stains, insects, splitting, decay, improper drying methods, and mechanical damage caused by poor handling methods.

By introducing methods of wood preservation, the volunteer can teach a community how to prolong the life of wood products such as telephone poles (where applicable), fences, stakes, etc. Setter preservation of lower quality woods would reduce the demand thr more dutable woods tor these purposes. Consequently, the binder quality woods could for more critical uses.

In agricultural areas, the forestry volunteer should promote agro-forestry practices as a means of naking the land more productive, and conserving its resources at the same time. The campagins about the rade water that by planning trees together with food crops, or by rotating trees and crops he can maintain destroying the land's productivity.

Successful agro-forestry systems can reduce the need for forest removal in two ways. It will eliminate the need for shitting cultivation (which usually entails note deforestation), because land that is utilizing agro-torestry should remain productive. It will reduce the need for more clearing of forests in order to increase food production. A well planned agro-torostry system should enable a rural family to be suff-sufficient in the basic tood, rugl, and lumber needs.

To neet better a rural community's lumber and energy neems, the torestry volunteer can organize the establishment of a community woodlot. This will require a major effort in community organization by the volunteer. The people themselves must feel the need for the woodlot. There must be strong public support of the project, and a community-wide willingness to share in the without this popula ment, raintenance, and benefits of the woodlot. Without this popula ment, raintenance, and benefits of the woodlot. Without this popula ment, raintenance, and benefits of the woodlot.

Changes in the attitude and habits of local government officials may be needed as well. It may be difficult for these officials to accept the idea of a community taking the initiative and organizing a major project themselves. The PCV should always

be conscious of the political problems that are involved.

The forestry volunteer can reduce deforestation for fuel purposes by introducing simple, low cost energy elternatives to his or her community. Solar, wind, bic-gas, and mini-hydro-power may all he possible depending on the specific conditions at the site. Such energy systems would greatly increase a campesino's self-sufficiency, and greatly reduce his need for irreducing the local solar dryers could be used for agricultural products such as grain of the control of self-sufficient of self-sufficient self-sufficient of self-sufficient he local wood supply for tuel.

By showing the wast quantities of resources in the forest Other than wood, the PCV may be able to convince the rural farmer that it makes poor economic sense to cut down the forest. The economic value of forest fruits, nuts, herbs, aquatic and terrestrial animals should be highly publicized.

Since many forestry volunteers may be in extensive livestock a reas, it is important that the EVV be aware of the factors involved in managing a range to ensure conservation of the range ToFources as well as maximum livestock production. The campesino must be made aware that if he desires a sustained yield of I ventock over a long period of time, he must consider several

- The selection of the most suitable kind of livestock for the land available.
- The recognition of the proper seasons of grazing.
- The degree of range use, including the proper distribution of animals over the range.
- 4. Available water resources for animals.
- 5. Protection of livestock from illness or injury.
- Available rorage crops. Livestock production can only be sustained by conservation use of forage crops.

Changes in the forest environment may have a significant of fiect on wildlife habitats. Thus, the Peace Corps forester may find himself working in wildlife management as well.

In order to manage a forest judiciously for its wildlife rossources, as well as its timber and land productivity. The forestor must be shie to recognize the wildlife species present, throwing the production of the production of the trowledge will enable the Peace Corps volunteer, or the campesine to determine what forest practices improve the environment for wildlife and what activities disturb it. For wildlife production and protection, as a mastic and terrestrial animals of such practicus as pruning, clearing, thinning, and timber cutting. The forestry volunteer may find that the most difficult part of his or her work will not be in actual plysical labor, but rather, in extension. The volunteer may have to overcome a great ceed of cultural and social resistance hefore successfully convincing the members of the rural community of the need for blanting trees, and proper land management.

The volunteer can use intellectual and economic arguments to make his case. He can demonstrate that an early and continued harvest is possible with integrated (forestry and agriculture) production techniques. The EVV can compare the income potential of tree planting with other uses. Often tree planting requires less capital and can be as fast an income producer as certain agricultural crops or livestock. It may require three to five years for a farmer to realize a profit on a new cattle herd.

The camposino should know that trees can be security in old age. By performing the physical labor when young, he can be assured of a good income to provide for his old age. It should be pointed out to rural farmers that while few people plant trees, those who do usually realize a very good profit.

The volunteer can also use a more personal approach to extension. He or she can emphasize to the campesino that in several years, his children will be attending school. Trees planted now can waw for his children's education.

The volunteer can ask the rural farmer directly what provisions he has made for his old age? What will he do if he or his family is ill and needs medicine but has no income with which to pay? Trees planted now would provide some insurance against such a situation.

Every volunteer will have a different personal style for extension. The only correct method is the method which works well for you and for the community in which you are working. The volunteer should carefully consider what style and approach will achieve the most success in his or her community.

> Peace Corps Volunteer Daniel Saxon contributed this article.

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SESSION YETY

Spanish Language

Potal Time: 14 hours

This is the last Spanish session before a week long field Trip. Instructor may want to review assignments, check charla Progress and give special assignments to trainees who need Continued practicé.

*Eocedures

ime

Activities

- 1. Review assignments.
- 2. Check charla progress.
- 3. Go over vocabulary,
- Have trainees form sentences using vocabulary list.

Vocabulary

Du - traza, tronco, rollo rollizo umber (sawn wood) - madera, aserada 3 Saw - aserrar > plane (wood) - cepillar Op chip (wood) - astillar hip (wood) astilla eneer - chapa Lywood - contra chapodo eliulose - celulasa ullo - ouloa i berboard - madera aglomerada ress board - madera prensada oulding - moldaduara Oard - tabla lank - tablon aw blade - hojo de sierra anels - paneles raft paper - papel kraft Ox, drawer - coion aste - desperdicio

aw material - materia prenia

SESSION I.

Field Trip Overview

Total Time: 14 hours

Goals:

- o To review objectives of field trip.
- o To go over schedule for field trips.
- Answer questions concerning field trips.
- Trainees set personal learning goals for field trip.

Objectives

The objectives for field trip(e) are presented in this session. The schedule of where and when trainees will be on field trip is carefully gone over. All questions are answered concerning objectives, schedule, reals and lodging. Trainees set personal learning coals for field trip.

Exercise I: Trainer(s) give overview of field trip.

<u>Materials</u>: Shedule for field trip. Flip charts, marker pens, tape.

Exercise I

Total Time: 1% hours

Overview

Trainer(a) give overview of following week's field trip(s) including, schedule, objectives and details concerning housing and meals. Trainees set personal learning goals for field trip.

Procedures

Time

Activities

14 hours

 Trainer(s) give overview of field trip(s).

- Trainees individually set personal learning goals.
- 3. In small groups they discuss their learning goals and make contracts with each other for reaching goals during field trip i.a., speaking Spanish at least I hour a day might be someone's goal. They could contract with another to speak with them.

OBJECTIVES OF THE FIELD TRIP

Objectives of the field trip are the following:

- Porest Extension Using techniques discussed in the classroom to practice actual forestry extension by visiting small farmers and/or colonists and trying to interest them in forestry projects.
- To reinforce classroom and practical training in setting up a nursery by visiting several nurseries in the tropics, observing and learning applicable techniques.
- To become acquainted first hand with the tropic species and the ecological environment in which they are present in the forests.
- To observe the tropical forests from the standpoint of forest management taking into account ecological considerations.
- To observe the rate and effects of deforestation by colonists and large timber concessions. To also become acquainted with their attitudes about forestry issues and how they have dealt with forestry problems.
- To observe plantations of exotic species and become aware of the problems (now and in the future) and the successes.
- To observe and become aware of how the provincial forestry offices operate and their acutal (operational) relationship to the head office.
- To continue to develop communicative skills especially those related to forestry subjects by actually conversing in Spanish with a cross-section of the country's population.
- 9. Through conversataions with government officials, small farrers and forestry company employees, to become acquainted first hand with the attitudes and barriers that impede forestry projects; and to become acquainted with possible solutions for dealing effectively with such attitudes and barriers.
- 10. To observe monocultures from the standpoint of the ecological and economic impact they might have on the community and country.
- To investigate cooperatives as a means of introducing forestry projects.
- To have an understanding of agricultural crops and their potential as related to agro-forestry projects.

OVERVIEW

The purpose of the field trip(s) is to give trainees the chance to practice extension: To approach techniques by actually talking with farmers. The field trip also reinforces classroom and practical training in setting up a nursery. Different species of trees are seen in their ecological environment. Forest management is observed from the standpoint of ecological considerations. First hand observation of the effects of deforestation by colonists and large timber concessions are shown to trainees. Trainees will also visit several plantations of exotic species and become aware of the problems and the successes of plantations. Participants will have the opportunity to converse with many government officials about forestry issues and research projects in which they are engaged. If possible, trainees will converse with cooperative members and observe Cooperative ventures. Agricultural crops will be investigated and their potential for agro-forestry projects will be discussed by trainers.

Trainer's Note

We have listed schedules for one Sierra field trip and one tropical field trip. We encourage trainers to get as many confirmations as possible and have back-up sites in mind in case something falls through.

A session to review the day's activities should be held each evening during the field trip.

TROPICAL FIELD TRIP

Monday, November 30

- Visit to Monterrey Pine plantation of Ingeniero Sotomayor. Discussions with him concerning situecture and economics of part of Discussions of future plans for incorporating a silve pattoral system into his farm sanagement. Observation of pasture management techniques and tetracing. Observation of pathological and insect damage to forest stand.
- 2. Observation of changing wegetation types from high sierra to humid tropic. Discussion on man's impact clearing and burning for establishing agricultural crops and pasture on steep slopes. Identification of some of the basic forest species (cecropia, app, Cordia allicotra). Observations of an agro-forestry system (Cordia, Bannans, Soffee).
- 3. Arrived Rancho Ronald
- 4. Volleyball games

Tuesday, December 1

- Met Ingeniero Rosero at Provincial Ministry of Agriculture office in Santo Domingo. Accompanied him to Ministry of Agriculture nursery.
- 2. Charla by Ingeniero Rosero on:
 - a. torestry history of area,
 - b. torestry program,
 - c. changing climatic conditions caused by deforestation,
 - d. obstacles in implementation of a successful forestry program.
- Nursery seed bed discussion and demonstration (trainee participation).
 - a. making seed beds
 - b. seed collection
 - c. seed treatment
 - d. sowing
 e. problems & solutions
 - aphids spraving
 - control of soil micro-organisms vapor
 - weed control spraying
 - managing bud worm no solution
 - f. preparing seedlings for outplanting making seudo estacas.
 y. methods of outplanting seudo-estacas.
 - h. disucssion on possible use of containers for seedling production of tropical species.
- Discussions on species produced in the nursery: (Cordia, Cedro, Pachaco, Cordia negro, Teca).
 - a. guayacan
 - b. growth rates fast growing exotics
 - c. economic possibilities

- d. ecological requirements
- 5. Lunch with Indeniero Rosero.
- 6. Visit to stand of Cordia Alliadora on a marginal site: a. poor stem growth
 - b. need of species for site with good soil conditions

 - c. spacing requirements for species d. efforts to improve stand by thinning and economic aspects for use of thinnings
- 7. Visit to commercial stand of Balsa:
 - a. Stand establishment: Direct seeding and early thinning b. growth rates
 - c. economic aspects: markets, prices, etc.
 - d. problems depletion of nutrients in soil possible need for fertilizers
- 8. Return to Pancho Poneld Dinner
- 9. Review of day's (and previous day's) activities.
- 10. Charla tropical forest management.
- 11.Group discussion: Ecuador Paraguay.

Wednesday, December 2

- 1. Charla (continuation) of forest management.
- 2. Purchasing food for lunch in field buying fruit etc. at local market.
- 3. Met with local Ministry of Agriculture officials and PCV working in Ouininde.
- 4. Visit to co-op nursery Lack of care and weeding. Discussion on establishment of nursery: Ministry of Agriculture-Coop arrangement. No co-op member was present for discussion as had been planned. Observation of natural Balsa regeneration.
- 5. Observations of recent logging and conversion of land to coffee and agricultural crops.
- 6. Observation and discussion of African Oil Palm monocultures over extensive areas. (500 ha). Nematodes, blight - epidemic potential.
- 7. Visit to Emdesa nursery.
 - a. Seed bed preparation; fertilization.
 - b. Problem Mahogany bud worm in Cedro.
 - c. Observed species in nursery; Teca, Guayacan, Cordia, Cedro Pachaco, Pinus patula, Pinus radiata, and Pinus caribe

- 8. Lunch along river; bird watching.
- 9. Visit to (1200 ha) stand and observed forest management practices to establish regeneration in cut-over stand:
 - a. elimination of annuals and undesirable forests species b. inventory of regeneration - determination of stocking level
 - c. inter-planting with Cordia and Guayacon d. elimination by weeding of annuals

 - e. monitoring results
- 10. Visit to tropical forest recently logged over:
- a, observation of tropical species and growing habitat
 - b. buttressing c. discussions on tropical wildlife: birds, monkeys, lions, etc.
- 11.Rancho Ronald (Arrived 9:30 PM) Dinner and then retired for evening.

Thursday, December 3.

- 1. Purchase of food at local market for lunch in field.
- 2. Met Ministry of Agriculture officials at provincial office in Santo Domingo. (2 officials could not attend as planned) left to attend co-op meeting and practice forest extension:
 - a. meeting did not materialize b. discussion by Ministry of Agriculture officials on how (how
 - not to) conduct extension - little contact or knowledge with people by Ministry of Agri
 - culture. - No follow-up of previous projects, - eliciting responses that agree with Ministry of Agriculture extensionist's
 - pasture better than forests.
- 3. Observations of cutover areas ±3 km both sides of newly located road.
- 4. Clearing of cutover areas for agriculture crops: large scale commerical mechanized production possible. a. loss of nutrients through leaching
 - b. Water and wind erosion
- 5. Visit to small sawmill. Observations on: a. poor utilization
 - b. type of machinery, lack of safety
 - c. economics: purchasing standing timber; selling saw boards. d. production of non-dimensional stock.
- 6. Swimming in river; interaction with local swimmers.

- 7. Return to Rancho Ronald.
- 8. Volleyball game.
- 9. Charla on watershed management.

10. Review day's activities.

11.Group discussions: Ecuador, Paraguay.

Friday, December 4

 Visit to Pichilingue agricultural experiment station and observations of:

- a. use of Teca as live fence posts
- b. agro-forestry
 - coffee/guayamba
 - coffee/laural - cacao/laural
 - cacao/rachaco poor - guayacan and teca plantations.
- 2. Visit to Quenedo; purchase of food at local market for lunch in country.
- Lunch and swimming
- Observation of changing vegetative types and changing climatic types (high fog) from tropical forests to paramo grass (high elevation - sierra).
- Dinner and overnight at Latacunga.

Saturday, December 5

- Visit to local market in morning.
- Meeting with Ministry of Agriculture officials; observations
 - a. species trials (no records available)
 - b. insect (detoiliator) and biological controls c. mixed plantation (patula & radiata)
 - syacinu - effects of thinning and pruning
 - d. leader and top die-back
 - e. Cypress plantation failure
- 3. Visit to Cotopaxi National Park.

Lecture on National Park and ecological reserves systems

- a. Park management and programs, b. problems: controlling exotics, hunting tourist flow, c. environmental/educational problems.
- 4. Return to Ouito.

SESSION LI

Ecology Teams Give Presentations

Total Time: 4 hours

Goals:

- For each team to give presentations which they have prepared for use in their geographic area.
 - o Trainers do summary of ecological issues and discuss

trade offs.

Overview

The objective of this seesion is to have trainees give presentation concerning ecology that they would possibly give at their site. Trainer gives some of his/her own insights concerning ecology.

Exercise I Ecology team presentations; trainer responses.

Materials - Trainee previously-prepared ecology presentations.

SESSION LI

Exercise I: Ecology Team Presentation Trainer Responses

Total Time: 4 hours

Overview

Trainees present scenario: "There is a great deal we do not know about our environment." Presentations have been put together for use at their sites. Ecology team is composed of trainees from similar climate and elevations.

Procedures

Time

Activities

approximately 30 min. each

- Trainee who has a special project is to manage this group of presentations, and introduces session.
 Rach team gives presentation.
- Trainer gives following response to presentation. Outline follows.
- 1.1 Segin with any project in the community development area; well construction, school gardens, agro-forestry, village woodlots, etc. Any community activity will, in one form or another, affect the environment somehow. Especially if "environment is understood in its broadest form, not only the physical aspects are felt but also health, environment social and cultural components social and cultural

A project normally is designed with specific results in mind. An attempt in made to provide well defined, 'targeted' to the people in the field. What is less clear is the nature and extent of incidental consequences; these activities which might bring about less results. Or adverse or negative

In reality, more often than not the good will have to be taken with some bad. Choices often involve trade-offs. The challenge then consists of developing a system where trade-offs are as favorable as possible to the people involved.

SESSION LIT

Individual Interviews

Same as Session 19.

SESSION LITT

Review of Field Trips

Total Time:

Goals:

- o For trainees to look at the objectives of the field trip to determine if they have been met.
- o For trainees to be able to give an overview of their experiences while on the field trin.
- o To be given the assignment "The role of the Porestry Volunteer...A Transition to Peace Corps Service."

Overview

In this session trainers look at their field trip(s) experience and the objectives of the field trip and past on newsprint their findings. The field trip groups report their findings to each other. They receive their final assignment to write an essay about the role of the forestry volunteer, a transition to Peace Corns Service.

Exercise I: Checking objectives of field trip.

Materials: Objectives of field trip(s), flip charts, marker
pens, tape.

SESSION LITT

Exercise I: Checking Objectives of Field Trip

Total Time: 15 hours

Overview

Trainees now have completed one week of field work and Observations, they now take time to see how well they reached the objectives of the field trip. They also share the experience with Others who did not accommany them.

Procedures

Time

Activities

1. Trainees review the objectives of the field trip, going through each one to see how well they were ret. Findings are mosted on newsprise.

45 minutes
30 minutes

Trainees select members of their group to present findings. Presentations are made.

Trainer summarizes findings of all groups.

 The trainer then gives the assignment "The Role of the Forestry Volunteer - A Transition to Peace Corps Service."

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THE ROLE OF THE FORESTRY VOLUNTEER A TRANSITION TO PEACE CORPS SERVICE

Please present a clear, thoughtful, and concise description of your perception of your role as a Peace Corps Volunteer. Include the following points for consideration:

- o Your definition of torestry service in Peace Corps,
- Your understanding of the job or project to which you have been assigned,
- The manner in which you have been prepared by this training program,
 - Your honest appraisals of your skills in physical cognitive and social areas,
 - The limitations you perceive in your abilities and in the potential job situation,
- Methods you will consider to encourage the active participation and inclusion of all community members affected by your project,
- How your job or project may contribute to improving the quality of life of people affected,
- Methods you plan to use for effective community involvement in the application of forestry technologies and extension techniques.

The description should be prepared carefully, and should reflect your philosophy and current perspective in training and Peace Corps service. A copy of your paper will be given to you to take with you. It will be interesting to review and compare with your realities and job situation syear from now.

SESSION LIV

Project Planning: Goal Setting

Total Time: 4 hours

Goals:

- To integrate the technical material, problems identified and personal learnings into a clarified set of personal and project goals and objectives.
- To write immediate project goals and those in three months.
- o $\,$ To identify and list resources needed to accomplish goals.
- To identify personal learning goals for the next three months.
- Review learnings of and accomplishments in last 15 weeks of training.

Exercise I: Lecture on goals, objectives and activities.

Individual work on three month project plan.

Individual work on personal learning.

Materials | Flip charts, marker pens, tape. Participants may want to bring their journals.

 ${\bf Trainer's}$ Note: You may want to suggest that participants bring their journals to this exercise.

SESSION LIV

Exercise I: Project Planning, Goal Setting

Total Time: 4 hours

Overview

In this session trainess take time to plan their projects and set their own goals. They will deal with integrating the training they have received, problems that have been identified and personal learnings. They will also look at accomplishments they have made since the beginning of training in-country.

Procedures

Time

Activities

- Trainer opens the session by explaining the goals of the session; making linkeges to the prior sessions will now stress their role as a volunteer. All the information they have gathered over the past l4 weeks is to he incorporated into a series of plans for the future.
- Ask each person to review and list their najor learnings during training.
- Ask each person to review the learning goals they have set for themselves in session five. Now put into a written statement, if they have reached these goals.
- 4. Ask each person to then fill out the following matrix. Explain that the exercise has two parts. The first considers the specific volunteer project assignment. The second part asks people to set out goals for personal learning or development.

a. Where would I like to be on my uroject in 3 months?

Goals To Do's By When Resources

b. Benchmarks (or milestones)

To get to my next 3 month goals, I plan to have accomplished the following in 6

Objective To Do's By When Resources Needed

c. When I get to my site, I plan to do

Goals To do's By when Resources

- 5. After the exercise is completed, ask the group to review the "goale", "to do's" and "resources needed" in pairs. Remind the group that this is another opportunity to use their planning skills and apply them to this situation. Use the following usestions.
 - Is the plan realistic, feasible?
 - What will I do to measure success?
- 15 minutes BREAK

1 hour

20 minutes

30 minutes

15 minutes

- Personal learning/action goals: Ask each person to look over their journal entries and the chart they made earlier and consider what they want to set as personal learning or action goals for the new three months.
- 7. When the list is completed, ask the group to go back into the same pairs again and review each person's plan. The group should be instructed to share only what they feel comfortable sharing. Some areas may be private.
 - 8. Close the session by asking:
 - 1) What have you learned from this process?
 - 2) Is there any unfinished business?
 - 3) Will you be able to apply these tools in your work with the community?

PORESTRY TECHNICAL TRAINING

ECUADOR/PARAGUAY

Introduction to Planning (Sample Outline for Lecture)

- The ability to plan is a key characteristic of a professional.
 - A. Need for Planning:
 - Necessary for effective Peace Corps Service.
 - Neccessary for most host country agencies.
 - 3. Underdevelopment is as much due to poor planning as
 - B. The planning process begins with the establishment of clear objectives.
- II. The formation of clear useful objectives.
 - A. The need for clear objectives.
 - The desired outcome of the project must be clear to plan necessary activites and tasks.
 - Evaluation of project effectiveness requires clear objectives.
 - B. The qualities of meaningfully stated objectives.
 - They identify in concrete terms the terminal project situation or behavior and give a picture of what should exist at the end of the project.
 - They identify any pertinent conditions or assumptions that would affect the achievement of the project objectives.
 - To forewarn participants of any possible problems.
 - To avoid misunderstandings when objectives are not met due to outside factors.
 - They specify the criteria used to establish acceptable project performance, giving a statement of specific quality, quantity or time necessary for fulfillment.
 - They are stated in concrete non-ambiguous terms:
 a. Terms often used in objectives that are open to many interpretations.

- TO MOTIVATE people to plant trees,
- O TO TRAIN people in nursery management.
- TO UNDERSTAND the essentials of nursery management,
- o TO ENCOURAGE tree planting.
- b. Terms open to fewer interpretations:
 - TO ESTABLISH a nursery capable of producing 100,000 healthy trees each year.
 - o After participating in the training course participants will be able: TO DESCRIME AND DEMONSTRATE the following essential skills of a forester.
 - After training they will be able TO MAKE A LIST of most common pests and diseases found in numeries.

CDCCTON TW

Spanish Language

Total Time: 1% hours

Overview

In this session trainees present to the instructor and each other charles they have prepared for use in the field. Instructors and other trainees give presenter feedback on content, pronunciation and manner in which they presented the charla. Trainess have been encouraged to use illustrations and other visual aids.

Procedures

Time

Activities

1. Each trainee is to give a full 5 minute charla on some aspect of forestry in host country. This charla can be a simple set of instructions on how to do 5 minute presentation something, i.e., thinning, gully plug or why the host country has a forestry program.

2. Each participant is diven feed-back on content, pronunciation, and manner in which they presented charla.

10 minutes feedback

SESSION LVI

Resources

'Otal Time: Open oals:

- Restate the importance of local resources so that trainees can register this statement again.
- Identify local resources, where to find them, how to approach them.
- National resource identification. International resource identification.

erview

What happens when volunteer really needs outside help? Have By looked at all the alternatives? Human? Monetary? In this Ssion we once again dwell on finding local resources and then Je to locating outside help. The implications of bringing in Eside help are explored. The where, who, how, and how to locate nds is explained in detail.

rcise I: Lecture on resources

erials: Plip chart, marker pens, tape

Optional: 1. Article by E.F. Schumacher

2. Catalogs, quidelines, newsletters from funding sources for display and perusal by trainees.

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SESSION LVI

Exercise I: Lecture on Resources

Total Time: Open

Overview

This exercise reemphasizes the importance of looking within your own communty first, having absolutely exhausted community resources, what to do next, who to go to and how to ask.

Procedures

Time

Activities

- Trainer gives a lecture on resources using following outline posted on newsprint.
 - 1.1 Do your really need outside help?
 - a. Have you exhausted local solutions?
 - b. What are the implications of outside help?
 - 1. Dependency
 - Non-support of local potential
 Creativity
 - c. Schumacher

Development depends on people not resources.

- 1.2 If you really need help:
 - a. What sources are available?
 - 1. 5 5 5 5 5
 - In kind material, equipment,
 - supplies.
 3. Information/technical assistance
 - h. What sources?

LOCAL

Private: clubs, service organization

professional associations, churches,

Government: local, national.

INTERNATIONAL

Private: Development groups, universities

Government: UNDP-FAO, AID, Peace Corps ICE, British, Swiss, USDA Experimental Station, Puerto Rico.

- 1.3 how to find out about them?
 - a. Curiosity, creativity.
 - b. Clearinghouse TAICH, Catalogs-FAU, USDA, Newsletters.
 - c. Write Wait.
- 1.4 How to get the most?
 - Be aware of their o speciality, o interest.
 - b. Follow their system or format.
 - c. Advance by stages.
- If available, a display of newsletters, catalogs and funding guidelines should be displayed for participants to browse through.

Trainer's Note:

If no one on the training staff feels comfortable with this lecture, you could probably convince the PTO from Peace Corps to do this one.

DEVELOPMENT

by

E. F. Schumacher (from: Small is Beautiful)

A British Government White Paper on Overseas Development some years ago stated the aims of foreign aid as follows:

To do what lies within our power to help the developing countries to provide their people with the material opportunities for using their talents, of living a full and happy life and steadily improving their lot.

It may be doubtful whether equally optimistic language would be used today, but the basic philosophy remains the same. There is, perhaps, some disillusionment: The task turns out to be much controlled to the perhaps, some of sillusionment; the task turns out to be much controlled to the same. Two phonomens, in particular, are giving rise to world-wide concern-mass unemployment and mass anigration into cities. For two-thirds of mankind, the aim of a signation into cities. For two-thirds of mankind, the aim of a fort controlling the same to be deferred to the same of the same to be deferred to the same of the same of the same to be deferred as a sever. So we had better have a new looks at the whole profilem.

Namy people are having a new look and some say the trouble is that there is too little aid. They admit that there are many unhealthy and disrupting tendencies but suggest that with more massive aid one ought to he able to overcompensate them. If the available aid cannot be massive enough for everybody, they suggest that it should be concentrated on the countries where the promise of success seems most credible. Not surprisingly, this proposal has failed to will querel acceptance.

One of the unhealthy and disruptive tendencies in virtually all developing countries is the mergence, in an ever more accontuated form, of the "dual economy," in which there are two different patterns of living as widely separated from each niter as two patterns of living as widely separated from each niter as two hand others being poor, both being united by a common way of life is a natter of two ways of life existing nice by side in such a manner that even the humblest member of the one disposes of a deally income which is a high multiple of the income according to exceed the humblest working member of the other. The social and to require description.

In the dual economy of a typical developing country, we may find fifteen por cent of the population in the modern sector, mainly confined to one or two big cities. The other eighty-five per cent exists in the rural areas and the small towns. For reasons which the confidence of the

is of course, what has happened in many of the highly developed countries—is utterly unrealistic. Even the richest countries are groaning under the hurden which such a maldistribution of population inevitably imposes.

In every branch of modern thought, the concept of "evolution" plays a central role. Not so in development economies, although the words "development" and "evolution" would seem to be virtually synonymous. Whatever may be the merit of the theory of evolution in specific cases, it certainly reflects our experience of economics and technical development. Let us imagine a visit to a modern industrial establishment, say a great refinery. As we walk around in its vastness, through all its fantastic complexity, we might well wonder how it was possible for the human mind to conceive such a thing. What an immensity of knowledge, ingenuity, and experience is here incarnated in equipment! How is it possible? The answer is that it did not spring ready-made out of any persons's mind -- it came by a process of evolution. It started quite simply, then this was added and that was modified, and so the whole thing became more and more complex. But even what we actually see in this refinery is only, as we might say, the tip of the iceberg.

What we cannot see on our visit is far greater than what we can see: The immensity and complexity of the arrangements that allow crude oil to flow into the refinery and ensure that a multitude of consignments of refined products, properly prepared, packed and labelled, reaches innumerable consumers through a most elaborate distribution system. All this we cannot see. Nor can we see the intellectual achievements behind the planning, the organizing, the financing and marketing. Least of all can we see the great educational background which is the precondition of all extending trom primary school to university and specialized research establishments, and without which nothing of what we actually see would be there. As I said, the visitor sees only the tip of the iceberg; there is ten times as much somewhere else, which he cannot see, and without the "ten", the "one" is worthless. And if the "ten" is not supplied by the country or society in which the retinery has been erected, either the refinery simply does not work or it is, in fact, a foreign body depending for most of its life on some other society. Now, all this is easily forgotten, because the modern tendency is to see and become conscious of only the visible and to forget the invisible things that are making the visible possible and keep it going.

Could it be that the relative failure of aid, or at least our disappointment with the effectiveness of air, has something to do with our naterialist philosophy which makes us liable to overlook the property of the control of the Our scientists incessantly toll us with the utmost emsurance that everything around us has evolved by small matations sieved out through natural selection. Even the Almighty is not credited with heaving beam sable to create anything complex. Every complex try we planners sees to think that they can do better than the Almighty, that they can create the send complex things at one throw by a process called planning, letting Athene spring, not out of the head of Zeos, but could nothingness, fully armed, resplendent,

Now, of course, extraordinary and unfitting things can occasionally be done. One can successfully carry out a project here or there. It is always nosebble to create small ultra-modern laines to be defended, like fortresses, and provisioned, as it were by helicopter from far away, or they will be flooded by the surrounding sea. Whatever happens, whether they do well or hadly, they produce the "dual accnomy" of which I have spoken. They construct the superson the narrounding society, and tend to

We may observe in passing that similar tendencies are at work even in some of the richest countries, where they manifest as a trend toward excessive urbanization, toward "megalopolis", and leave, in the midst of affluence, large pockets of poverty-stricken people, "drop-outs," unemployed and unemployables,

Until recently, the development experts rarely referred to the dual economy and its twin evils of mass unemployment and mass migration into cities. When they did so, they marely deplored wield received the sound of the sound o

ls there an alternative? That the developing countries cannot do without a modern sector, perticularly where they are in direct contact with the rich countries, is hardly open to doubt. What meeds to he questioned is the implicit assumption that the modern sector can be expanded to absorb virtually the entire population of the contact of the contact of the contact of the contact of development over the last weetly vested has been: "What is heat for the rich must he best for the poor." This belief has been carried to truly astoniahing lengths, a can he seem by inspecting.

the list of developing countries in which the Americans and their allies and in some cases also the Russians have found it necessary and wait to establish "paceful" nuclear reactors—Talwan, South Korea, Philippines, Vietnam, Thialme, Indonesia, Iran, Turkey, Portugal, Venezuela—all of them countries whose overwhelming problems are agriculture and the rejuvenation of rural life, since the great majority of their powerty-stricken peoples live in rural areas.

The starting point of all our considerations is powerty, or tabher, a degree of powerty which means misery, and degrades and stuitifies the human person; and our first task is to recognize and understand the boundaries and limitations which this degree of and understand the boundaries and limitations which this degree of the control of the white Pager which I have already quoted) and to overlook the impaterial factors. Among the causes of powerty, I are sure, the material is actors are entirely secondary—such things as a lack of infrastructure. The privary causes of extreme evolution, or control of the control of

Development does not start with goods; it starts with people and their advantion, organization and discipline. Without these three, all resources remain latent, untapped, potential. There are prosperous societies with but the scantiest besid of natural property of the property of the property of the law lad pleaty of opportunity to observe the prince of the law lad pleaty of opportunity to observe the prince of the law lad pleaty of opportunity to observe the prince of the law lad pleaty of opportunity of the law lad pleaty of the law lad pleaty of opportunity of the law lad pleaty of the law lad law lad pleaty of the law lad law

nere, then, lies the central problem of development. If the primary causes or powerty are deficiencies in these three respects, then the alleviation of powerty depends primarily on the removal of these deficiencies. Here lies the reason why development cannot be an act of creation, why it cannot be ordered, hought, comprehensively planned. Why it requires a process of evolution. Education does not "jump?; it is a gradual process of evolution. Education does not "jump?; it must gradually evolve to fit changing circums does not "jump?; it must gradually evolve to fit changing circums to be processed by step, and the same goes for discipline. All three must evolve step by step, and the evolution. All three must become the property not merely of a evolution. All three must become the property not merely of a liny minority, but of the whole society.

If aid is given to introduce certain new economic activities, these will be beneficial and viable only if they can be sustained by the already existing educational level of fairly broad groups of people, and they will be truly valuable only if they promote and spread advances in education, organization, and discipline. There can be a process of stretching—rever a process of jumping.

If new economic activities are introduced which depend on special ecoucation, special organization, and special discipline, such as are in no way inherent in the recipient society, the activity will not promote healthy development but will be more likely to hinder it. It will remain a foreign body that cannot be integrated and will further exacerate the problem of the dual economic

It follows from this that development is not primarily a problem of accommistar, least of all for economists whose supertise is found on a crucely material philosophy. No doubt, economists of whatever philosophical persuasion have their usefulness at certain stages of development and for atrictly circumscribed technical jobs, but only if the general guidelines of a development policy may be a superior of the problem of the

The new thinking that is required for aid and development will be different from the old because it will take powerly seriously. It will not go on mechanically, saying: "What is good for the rick must also be good for the poor." It will care for people-rfcm a severely practical point of view, why care for people? Because people are the primary and utlimate source of any wealth whatsoewer. If they are left out, if they are pushed around by whatsoewer. If they are left out, if they are pushed around by ever vield real frough.

SESSION LVII

Compost Heap - Insect Collection - Light Gaps

Total Time: 2 hours 20 minutes

Goals:

- To observe the results of the compost heap, prepared the first week.
- Use compost as top dressing (mulch in nursery).
- To aid trainees in obtaining a better understanding of tropical foresty dynamics.
- To give trainees familiarization and practical experience in the collecting of insects (for purposes of sending in insect/pest identification and possible control measures)

Overview

During this session, three unrelated technical forestry exercises are undertaken. The compost heap started in weak one is now ready for use. Trainees need to know the best way for collecting insects for identification and pent control measures. Lastly, light ups, a key to tropical forest dynamics, ie a process of which trainees need to be aware.

Exercises 1. The compost heap

- 2. Light gaps lecture
- 3. Insect collection and identification.

Materials:

Flip charts, marker pens, tape, compost heap (four weeks +) clear glass bottles (four ounces and under), alcohol, plastic bags (hand size).

CRECTON TOTAL

21

Compost Heap rvercise T

Total Time: 1 hour

Overview

Compositing is any process which facilitates or speeds up the natural break-down process of decomposition. One of the trainees who has started a compost heap in the first days of training now presents a lecture. The trainees then go to the compost head. Using compost as mulch for the seedlings, the trainees spread it on seed beds.

Procedures

& hour

Activities Time

> 1. Trainee who has started compost heap as special project gives lecture on starting compost heap. Answers questions from other trainees (See "The 2. Trainees now go to compost heap and (if

30 Day Hot Compost System").

ready), it can be used as mulch for k hour seedlings in the river that they planted during the first week.

THE 30 DAY "HOT" COMPOST SYSTEM

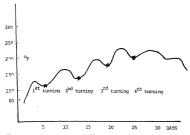
Composting is any process which facilitates or speeds up the natural breakdown process of decomposition. There are many forms of compositing some involve combining many types of materials that require long periods of time to hreak down. Times vary from three weeks to several years. The method that will be covered here is a 30 day or "Hot Compost" method. This is a system using high temperatures (up to 170°F) and frequent turnings to achieve a fast usable compost in 30 days. Several advantages to using Hot Compost include:

- 1) high temperatures eliminate weed seeds, disease and insect eggs,
- 2) quick usable compost is available in just 30 days.

Many believe that composting is a complicated and time-consuming process. This assumption can be over-come if a couple of basic principles are understood.

A hot compost has to be properly mixed with the correctly matched materials. In other words, don't just toss in any

old thing. While putting together a compost pile a helpful guideline to remember is the "Carbon:Nitrogen" ratios. The C:N ratio is the amount of brown or dried stalky materials (carbon source) that are mixed to the amount of green leafy or fresh materials (nitrogen source). A well balanced compost pile usually has a C:N ratio of 1:12 (1 part carbon to 12 parts nitrogen). It is important to maintain this ratio because a pile with too much carbon-containing materials and not enough nitrogen just will not heat up to achieve the 170° F temperature you want in your compost. A pile with too large or a disproportionate amount of nitrogen means nitrogen lost needlessly to the atmosphere in the form of NO2 gas (ammonia). Organic materials high in nitrogen are any type of fresh green material (i.e., fresh grass clippings, fresh young weed cuttings) or any type of animal manure; the best or "hottest" being chicken manure. Another source is kitchen scraps: coffee grounds or waste seeds (i.e., grape seed are especially hot). Materials high in carbon are usually brown dryed plant materials (i.e., leaves, dryed grass or straw, dryed weeds, saw dust or wood shavings).

Watch compost pile temperatures. Get a good soil thermometer to measure temperatures. One with a long stem is most useful. A good pile will heat up to 110°F within 24 bours of being mixed. Within 3 days it should be up to 125°F. If it does not heat up within the first 3 days take it apart and start over. Each time the pile temperature begins to drop (every 4 - 5 days) it will be time to turn begins to the start of the start over. Because the start over




- (3) TUNNING THE PILK. The first turning is the hearisst, and most Line-consuming, but if it is done right the rost will be easy. Once the pile is put together and has heated up correctly to 120° er so it might maintain this temperature until about day 5 or 6, then will begin to drop. At this point, take a pitch fork and move the pile. While rebuilding it, mix all the materials that were on the outside into the center of the pile, so that they will heat up this time. Also break up large pieces of organic material with a methet or maddock as they will be broken and once involve anything more than a hour of tossing the pile from one spot to another with a pitch fork and showel.
- (4) The time to think about the amount of moisture percentage in the pile is while your are putting it together. Sometimes a pile will not need any added water other than the natural moisture contained in the compost material. An example of this would be treah green materials (grass clippus). A sent in the pile is that the material should feel like a squeezed out sponge. It should not, however, release water if very tightly squeezed. If water is required it should be judiciously applied to each layer as the pile is being built, rather than watering it from the top after the pile in the pile and not anough water can retard becarial growth and the pile will not thest up.
- (5) AIM: Composting is an aerobic process. Soil microbes need oxygen to develop. Try to avoid building the pile higher than four test, otherwise poles layered horizontally in the composition of the pile of t

PUTING IT ALL TOGETHER: Start the pile with a 5 inch thick layer of leaves to provide good grainage. Next layer should be 2" of grass clippings, lossening it up to keep it from matting down. On top of this sprinkle a mixture of top soil and organic manuer. This will increase the nitrogen content

some and inoculate the pile with soil microbes (the power house of the compost pile). If kitchen scraps are available they can also be added here. Water each layer lightly - if needed. Now repeat the whole process until all your materials are used up.

Compost is the back bone of my nursery and home garden. Once you hegin to use it, it becomes invaluable. Be patient. I have yet to meet the person whose first pile heated up properly. But with time and practice, you can expect much in return for little invested.

Peace Corps Volunteer Bob Simeone authored the above section.

Insect Collection

Total Time: 50 Minutes

Overview

Trainees need to know the proper methods of collecting insects for identification. In addition, trainees need practical experience in collecting insects for the purpose of sending in insects for pest identification and possible control measures.

Procedures

20 minutes

Time

Activities

 Trainee who has taken insect collection as a special project presents a brief lecture and demonstrates insect collection, using the following procedure:

A. Catching

- 1. with hands and plastic bags,
- coffee jars with alcohol,
- killing jars with acetate,
 KCN (not recommended),
- KEN (not recommended),
 insect collecting net made using a stick, a coat hanger and a piece of mosquito netting.

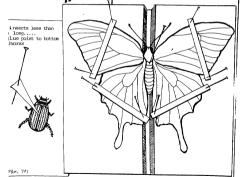
B. Preserving

- 1. mounting with pins,
- paints on pins for small insects,
 mounting butterflys (spreading)
- wings),
- in glycerine, alcohol or formaldehyde,
- 5. accompanying the insect specimen, the date, location and name of collector should be noted. This is often put on a small piece of paper which is placed on the pin mounting the insect.
- Trainees now go outside and practice collecting insects. They use only glass jar with alcohol method during this exercise.

3 hour



FOR EUTTERFLIES AND POTES: 1) use mounting board, 2) pin behind head, 3) pin strips of paper over wings



Exercise III Light Gaps

Total Time: 20 minutes

Overview

This short lecture is to give trainees a better understanding of more of the dynamics of the tropical forests.

Procedures

Time Activity

20 minutes . 1. Technical trainer gives lecture using following outline.

OUTLINE - Light Gaps

Light gaps

one of the most important keys to understanding tropical forest dynamics. Large trees fall over and knock down other trees with them resulting in a gap in the forest canopy (light gap). In these gaps, surrounding trees wil spread their crowns out horizontally at the same time pioneer species or light gap species will take advantage of these openings and will begin rapid growth.

Gap species

could be existing seedlings in the understory or viable seeds in the forest which could germinate.

With the falling over of a large tree, several different micro-environments are created:

(1) exposed minerals in the soil where the tree was rooted.

(2) roots of the tree with atttached soil.

(3) surrounding areas opened to sunlight.

(4) dense, large areas where the tree crown is laying on the ground.

Different species will occupy each of these different environments.

A further study of light gaps and their relation to the dynamics of a tropical forest will enable us to better our understanding and our ability to develop workable forest management plans for tropical forests.

SESSION LVIII

Spanish Language

Total Time: 15 hours

Overview

In this session trainees continue to present charlas. Each trainee should have two charlas which they can present, time permitting.

Procedures

Time

Activities

- 1. Each trainee is to give a full 5 minute 5 minute presentation charla on some aspect of forestry.
- 1U minute feedback to each charla presenter 2. Each participant is given feed back on content, pronunciation and manner in which they presented charla.

SESSION LXIX

Exercise I <u>Cultural Shock</u> - Are we Ready for It?

Total Time: 2 hours

Overview

In the process of yetting trainees ready for volunteer Service and with the realization that many participants will in a few short days be alone for the first time in their project sites, we once again go over the process of cultural shock.

Procedure

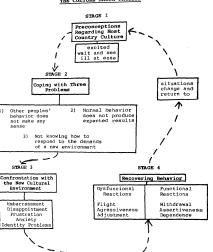
FICCEGGIE		
Time		Activities
10 minutes	1.	Trainer gives brief introduction and goes over goals. Reminds trainees that this subject has been covered before, but now they are almost ready to yo to their sites for two years of volunteer service. We should then go over the following stages.
	2.	Trainer using the following diagram posted on newsprint asks trainees to break into groups of five or six and discuss each stage. They should discuss the following:
10 minutes	Α.	Ways to cope with the problems in stage two.
10 minutes	В.	Feelings that will be generated during stage three.
10 minutes	c.	The inevitable reactions in stage four.
20 minutes	D.	Trainer now hands out to the group, fears and hopes form, and they make list of fears and hopes.
20 minutes	Е.	Trainer now hands out "check list" for fears and hopes. Trainees discuss their lists using check list.
5 minutes/ group	F.	Bach group is asked to prepare a statement to give to the large group. This presentation should include highlights of small group discussion and

points they would like to stress.

15 minutes

G. Trainer now does summary of exercise. Picks up points that have been raised during presentation. May add some of own experiences which are appropriate to alleviate fears that have been raised.

THE CULTURE SHOCK PROCESS



CHECK LIST FOR FEARS AND HOPES

- Are the fears and hopes realistic or not? (Let's find out through concrete examples).
 - What is the cultural dimension of each fear and hope? (From where are those fears and hopes coming?)
- 3. What can be done to overcome the fears if necessary and build upon the hopes?
 - a) the anticipated negative responses from others: are they real or imaginary?
 - the obstacles which prevent the implementation of what people wish to do but do not do.
 - c) the required modifications for making the ideas acceptable?

FEARS

l. to fail

2. to be misunderstood 3. to hurt people

4. to lose face

5. to be rejected

Others

HOPES

1. to learn something

2. to grow from the experience

3. to adjust

4. to help others
5. to be successful

. to be successfi

Others

SESSION LX

Grafting and Fruit Trees

Total Time: 34 hours

Goals:

To acquaint foresters with fruit tree care and grafting techniques.

Overview

Foresters are often expected to be experts in all trees including fruit trees - so it is important to be aware of fruit tree culture.

Exercise I: Lecture on fruit trees and grafting practice.

Materials:

Pruit trees for thinning, grafting, sharp knife, sharpening stone, plastic tape (grafting tape), bees wax.

SESSION LX

Exercise I Lecture on fruit trees and grafting practice.

Total time: 34 hours

Overview

In this exercise trainees learn about fruit trees and fruit tree reproduction. $% \left(1\right) =\left(1\right) +\left(

Procedures

Time

Activities

 Trainer gives the following lecture on fruit trees.

Grafting and Fruit Trees

FRUIT TREES AND FORESTRY

Poresters are often expected to be experts in all kinds of trees including fruit trees - so it is important to be aware of some of the basics of truit tree culture.

- I. Differences between forestry for wood products and for fruit
 - A. Short term, usually annual production cycle.
 - Intensive cultural practices; fertilization, pruning, grafting, disease and pest control.
 - C. In summary, fruit trees are domesticated trees needing a series of special treatments.
- II. Critical Cultural Practices in detail
 - A. Pruning
 - 1. Specific systems vary according to the crop
 - 2. Some basic rules are generally valid
 - a. space for every branch and a branch for every space.
 - b. watch the timing generally in the lowest growth period (dormancy) of the tree.
 - c. prune in a way that the tree can heal over clear cuts, no projecting stumps - so that rain will not collect in the cut.

B. Grafting

- What? The union of the cambium layers of a parent tree (stock) and a desired variety (scion) in such a way that the two form a solid, growing unit.
 - a. continued growth from the scion is true to the scion's characteristics and is <u>not</u> a combination of stock and scion.
 - essential to protect grafts of all types with wax and/or by wrapping to prevent drying out or mechanical damage.
- 2. Whv?
 - to achieve desired variety of fruit with root stock adapted to local conditions.

- to gain time multiplying a desired variety; faster than plants from seeds.
- c. to assure genetic purity.
- d. to have several varieties on one tree for pollination purposes.
- for repair purposes renewing an old tree or repairing girdled trunks - rodents or mechanical damage.
- 3. When? Beginning of the growth period.
- 4. Types
 - a. top working renewing of a tree
 - o cleft graft,
 - o whip graft, o bark graft.
 - h. repair
 - o bridge graft
 - c. budding
 - o most practical and reliable,
 - demonstrations and practice of cutting bud shields,
 - T-cuts, inserting and wrapping.
- 2. Trainer now demonstrates grafting technique and trainees practice techniques.

Trainer's Note: During pilot we were able to arrange for some trainees to observe beekeeping during this same time. We gave trainees the choice between fruit tree grafting and beekeeping.

CESSTON TYP

Spanish Language

Total Time: 14 hours

Overview

In this session the writing of letters to officials is covered.

Procedures

Time 14 hours Activities

1. Instructor goes over letter forms and trainees draft short letters that they may need to use.

SEE FOLLOWING GUIDELINES FOR WRITTEN COMMUNICATIONS IN SPANISH

ASDELA - Centro de Entrenamiento

Some Guidelines for Written Communications

in Spanish

In Latin America written communications are very important and the form used should follow accepted local patterns.

There are several aspects in formal communication that should be watched closely. Some of them are:

- Titles: Be careful to find out the correct official title of the person to whom you are writing.
- Hierarchy: Be careful to respect the levels of authority within the organization being approached.
- "Tuteo": Be careful with informal usage. It is always safe to use "Usted".

What follows are sample letters at various levels of formality. In each case some alternative forms of openings and closinus are provided.

In every case of sending a formal communication it is highly recommended to have your draft letter reviewed by a school teacher, business person or some knowledgeable person who would be able and willing to correct your letter and put it into appropriate local terms.

MODELO DE CARTA

Ouito, 27 de noviembre de 1981

Señor Ing. Celso Minuche S. Jefe del Departamento de Investigación de Sirios Giudad.-

Apreciado Celso:

Luego de saludarte y desearte éxito en tu trabajo paso a comicarte que he visitado los lugares posibles para la iniciación del vivero en la zona. Para decidirlo definitivamente te propogo un viaje de reconocimiento, al cual yo podría acompañarte para hablar sobre las ventajas y desventajas que he visto. El sitio si llama "El Pedregal" en el km. 5 de la via a Paján.

Espero tu respuesta para concretar la fecha de visita al sitio.

Tu amigo,

Roberto Smith

Portoviejo. 27 de noviembre de 1981

Señor Ingeniero Raúl Pérez Calderón Representante local del MAG, Jefe Regional Ciudad

Estimado Señor Ingeniero:

Yo, William Smith, Voluntario del Cuerpo de Paz, actualmente Técnico Forestal en el proyecto de Forestación de la Zona de Portoviejo, Provincia de Manabi; me permito solicitar a Usted, se digne aprobar el presupuesto que es necesario para realizar un proyecto de investigación forestal en la zona.

Dicho presupuesto ha sido ya presentado a usted en fecha anterior.

Por la amable atención que se sirva dar a la presente solicitud, le anticipo mis agradecimientos.

Muy atentamente,

William Smith

Nota: Mi dirección es:

William Smith Casilla 24 Portoviejo

MODELOS DE SOLICITUD

Quito, 28 de noviembre de 1981

De mis consideraciones:

Por medio de la presente y consciente de su interés en el desarrollo agrario del país, me permito invitarlo muy cordialmente a la inauguración del vivero forestal que se realizará en el Centro de Forestación de Conocoto, el día lunes 14 de diciembre a las 10 de la mañana.

Seguros de que su presencia dará realce y solemnidad a este acto, le anticipo mis más sinceros agradecimientos.

De Ud. muy atentamente,

Lcdo. Marco Jackson Voluntario del Cuerpo de Paz

ESOMEMA DE UNA SOLICITUD

FECHA: LUGAR, DIA DE MES DE ANO

ENCABEZAMIENTO:

- Titulo
- Nombre - Cargo o función
- Lugar

2. - SALUDOS

- De mis consideraciones:
- A quien corresponda:
- Muy Señor Mio: - Estimado Señor:
- Muy Senores Nuestros:

3. - ASUNTO O CUERPO DE LA SOLICITUD.

AGRADECIMIENTO:

- Por la favorable acogida que se digne dar a la presente le anticipo mis agradecimientos.
- Por la atención que se sirva der a la presente le reitero mis agradecimientos.
- Le agradezco de antemano por la favorable acogida que se digne dar a la presente.
- Agradeciéndole sinceramente.
- Por la stención que se digne dar a la presente, me auscribo de Ud. muy atentamente,

Quito, lo. de diciembre de 1981

Seffor Doctor John Williams · Director de Catholic Relief Service Ouito

De nuestras consideraciones:

La Cooperativa Agricola del Pueblo de.

Canton: Provincia de. integrada por ciento cincuenta socios, està empeñada en realizar un proyecto commani de forestación que oubrira 10 nectareas de ésta
localidad. El proyecto incluye una serie de areas que beneficiarán
a los miembros de la cooperativa y a la comunidad. Tales proyectos

 Empleo de las áreas desocupadas, prevensión de la erosión que amenaza nuestras tierras.

Por tal motivo y conocedores de su alto espiritu de colaboración que anima a la institución que tam acertadamente la dirige, solicitamos su atención con el fin de que nos proporcione apoyo económico, ya que nuestra comunidad carece de los medios necesarios para llevar a cabo dicho proyecto.

Para una mejor comprensión de nuestro proyecto, adjuntamos a ésta, los detalles del plan de forestación de nuestra cooperativa.

Por la favorable acogida a la presente, le anticipamos nuestros mas sinceros agradecimientos.

De Usted, muy atentamente

Javier Núñez	Marcelo Rojas
Gerente de la Cooperativa	Secretario de la Cooperativa

SESSION LXII

Professional Approaches to Interaction with Host Country Officials

Goals:

 To help trainees adopt a professional demeanor when interacting with host country officials.

Overview

In this session trainees will practice interacting with host country officials in a professional manner. $\,$

Exercise I: Role Play

Materials: flip chart, marker pens, tape.

Exercise I: Role Play

Total Time: 15 hours

Overview

Through a series of role plays and the processing of those role plays, trainees will come to understand the importance of interacting professionally with host country officials

Procedure

Time

Activities

- Trainer introduces a series of role plays and trainees take on roles of volunteers to practice professional interactions.
- The important part of this exercise is the processing.

Trainer's Note: Role plays that follow are samples. You may want to write your own based on actual people.

Role Plays

- Bruce (1) MAG official is pro-U.S. and anti-communist. He is in favor of U.S. invading Cuba, Nicaragua etc., to stop the spread of communism. He sees PCV as anti-communist. Criticizes U.S. for its weak foreign policy (does not bomb Cuba. etc.).
 - Volunteer this is your first visit to MAG official who will be your contact for your job.
- Bruce (2) MAG official is leftist. U.S. is inflicting misery and capitalism on poor people in Third World countries.
 U.S. is sending PCVs to Third World countries as spies to influence public opinion in these developing nations.
 (PC and CIA are both run by the State Department)

Joan

Bruce (2) Counterpart & PCV arrive at MAG office. Counterpart and MAG official are old friends, with family ties, etc. PCV is completely ignored.

Gene

- George Established PCV arrives at MAG office. He has been working two years with MAG official and is good friends with him. MAG official lets it be known that he is worried about new PCV who is quiet, immature, and specks little Soanish.
- Gene Female PCV comes to visit MAG official. He makes pass at PCV trying to get her to commit to meeting later, going to dance or dinner together.
- Francisco PCV Visits MAG official for first time. MAG official is nice, very helpful and intorested in work plan of PCV. He offers assistance and help in getting PCV to work on urgisets.
- Francisco PCV visits MAG office for first time. MAG official interested in agricultural crops and tries to exclude any reference to planting forest trees. Tries to get PCV to help in planting potatoes and onions for MAG official's personal use.

SESSION LXIII

Final Interviews

Total Time: 2 hours

Goal: To conduct final interviews with trainees.

Overview

This is the final interview with trainees. Last chance for coaching. Trainees will definitely be praised for good work and positive skills.

Procedures

Activities

Time 2 hours

1. Same as other interviews except trainers may choose which trainees to interview. It is suggested that those trainers with whom trainess identify most closely interview those trainees.

GRADUATION

Total Time: 2 hours

Overview

During pilot program Certificates of Completion of Training were awarded to trainees by host country Forestry Director.

Procedures

mi ma

Activities

1. To be arranged

Trainer's Note:

We allowed trainees to design their own graduation exercise. We had the host country Director of Forestry speak in addition to the Peace Corps Country Director, and the Agricultural Attaché from the U.S. Embassy. Two trainees gave short speechs of "thank you."

